JPRS-UAC-88-001
14 JANUARY 1988

FOREIGN BROADCAST INFORMATION SERVICE

JPRS Report

Soviet Union

AVIATION & COSMONAUTICS

No 7, July 1987

Soviet Union

Aviation & Cosmonautics

No 7, July 1987

JPRS-UAC-88-001 *14 JANUARY 1988*

CONTENTS

Improvement in Elements of Combat Potential Traced

91440049a Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 1-3

[Article by Lt Gen Avn I. Sviridov, USSR Honored Military Pilot: "To Strengthen Combat Potential"]

[Text] The social ideal of our fatherland is peaceful, creative labor by the Soviet people for building a communist society. However, the reality of the modern world requires the diverting of enormous material, spiritual and human resources into national defense. In line with this, the duty and responsibility of each Soviet soldier have risen immeasurably for mastering the combat capabilities of the weapons and combat equipment assigned to him.

Aviation systems are a complicated, expensive and collective weapon and the combat mastery of the military aviators presupposes personal responsibility for its study and correct operation without any allowances and approximations whatsoever. For what goal should we work in planning and organizing combat and political training, in carrying out the flights, in conducting tactical flight exercises and in assessing the results of military service?

The capabilities of the Air Forces in carrying out the tasks of defending the socialist fatherland are most completely characterized by the concept of "combat potential" which is defined as a strong fusion of military skill and high technical equipping, ideological steadfastness, organization and discipline of the personnel and their loyalty to patriotic and international duty. To fill out each component of combat potential with a content corresponding to its social purpose is not only a social task but also a profound inner desire of each Soviet aviator. This is a permanent task for the near and distant future.

It must be pointed out that various components of combat potential depended differently upon the personnel, since each specialist has his own specific duties in relation to the constituent components and to the strength of the "fusion" as a whole. Everything depends upon us, the aviators, upon our industriousness, tenacity, purposefulness, creativity and planning in work.

Technical equipping, an important component part of combat potential, serves as the material basis for the combat capabilities of military aviation. It has one particular feature: the equipment, as the material embodiment of combat capabilities, is received by us from the defense industry in a ready-made form and with a superficial approach these capabilities do not depend upon the specialists of the line units. But is this the case in reality?

In speaking solely about the technical aspect, our specialists can have a very active influence on the equipment. Open to the personnel of the aviation units is an enormous field of activity in the form of "minor technical forms." In these one could put primarily everything concerning the modernization, study and operation of the equipment being delivered. This is various hand tools, diverse functional trainers, training stands, equipment which accelerates and simplifies the inspecting of the technical state and reliability of the aviation systems and, finally, the modernization of equipment and methods, repairs and the development of convenient and easily transportable replacement units for equipment. There are points of application for the inventive and innovative forces of the flight and technical-engineer personnel. And the experience of the leading units convinces us of the exceptional effectiveness of this diverse creative activity. There are no collectives where there are not persons searching for and developing fine additions to the technical equipping of the Air Forces. There has been high praise for the inventions and innovative proposals of Cols G. Cherenkov and L. Ploshchenkov, Maj V. Zhukov, Capts A. Legankov and S. Yemtsov and Sr Lt V. Bulavskiy. At the same time, it must be admitted that in various units the effect from innovative and inventive works varies. In some this creative undertaking has a planned and systematic nature and in others chance and disorganization reign.

It must be said that recently there has been a significant rise in the creative activities of the flight personnel in the line units and the specialists of the Air Forces VUZes [institution of higher learning] and the military scientific institutions on the questions of tactics and operational art. Last year many officers and author collectives took part in the competition for developments and the theoretical background studies for new tactical procedures and combat methods as well as in improving existing ones. Many works were approved and adopted in the subunits.

For example, prizes were awarded to the works of Lt Col Ye. Manshin, the author collective of the aviation unit consisting of Lt Col A. Gunko and Majs A. Kononov, V. Dyuzhenko and B. Grigoryev and the author collective consisting of Cols V. Mogilskiy and N. Parokonnyy and Lt Col Yu. Nadolinskiy from the Yeysk Higher Military Pilots School. Valuable gifts, certificates and commendations of the Air Forces commander-in-chief were awarded to Cols G. Karev and N. Neshto, Lt Cols P. Makshakov, L. Kagala, V. Tolkov, V. Smusenok and P, Guryev, Maj G. Yakovlev and Capt Yu. Krovorotov.

The aviation units have many highly skilled and talented pilots, engineers and technicians who are innovators. They truly have the golden touch. All the creative energy of the innovators must be directed into a single practical channel and concentrated on specific problems considering their acuteness and the sequence of resolving. Then technical creativity will become a strong addition to the combat might of the Air Forces.

The personnel is linked even more closely to such a component of combat potential as combat skill. Since combat potential is a calculated indicator of combat might, it shows that goal to which we must strive. Combat might is formed and built up in the course of daily training, that is, in exercises on the theory of combat employment, in drills, in the process of flight training and the LTU [tactical flight exercise].

Each of the forms of combat training merits careful analysis and assessment. For example, the LTU. Precisely here there is an integrated assessment of combat skill and the achieved level of combat maturity and real combat might are most clearly apparent. Here it is essential to point out that the LTU have very many different aspects. For example, the sequence of carrying out the exercises planned for the year by the subunits.

When is it advisable to conduct a LTU on a specific question? The logic of combat training suggests an obvious cycle. A certain aspect of combat training becomes most important at a certain period. Theoretical exercises, tactical drills, trainer sessions and of course flights which differ in terms of specific content of the exercises but are similar in general focus are devoted to this. Certain pilots are taking their first steps along the selected area of combat employment, others are improving theirs while the most experienced are mastering new difficult difficult-to-execute procedures and are testing their effectiveness in the air. In this manner the subunits are brought to a certain training level essential for conducting the exercises.

After such a serious preparatory stage, the commander who organizes the LTU determines the difficulty of the task which will be carried out by the collective so that all participants in the exercise work at a higher level of personal training. It is not easy to set such a task. It is essential to analyze enormous material, the content of the new procedures, the over-all tactical level and the number of prepared personnel for each level of complexity and advancement.

In knowing all of this it is essential to work out an assignment which will ensure work to the limit of the achieved and inspect all the mechanisms of the troop collective, to temper the LTU participants morally and psychologically and guarantee unconditional flight safety.

Seemingly this is all apparent. But often there is a different approach to conducting exercises. For instance, a period arrives when basically the flights are carried out under instrument flying conditions. At this time visual conditions are rare. The flight personnel develops in combat employment in clouds. But when there are clear skies for one or two shifts, they organize flights in the aim of maintaining the previously achieved level under visual flight conditions. Suddenly a LTU is held on a question which clearly gravitates toward cloudless weather. There is no effective and systematic preparation. There were merely flight to maintain the level. And all at once the LTU. Is there any logic in such an approach? As strange as it may seem, there is. In truth, it has nothing in common with true concern for combat skill. Here there is something else, the view of the LTU as a lamentable quantitative indicator which must be "filled in" as soon as possible and reported on as quickly as possible. According to this unique logic, it turns out that a LTU under instrument conditions will be carried out when the sky is clear and when it would be difficult to "make up" the number of participants who have purely the legal right to a certain type of training.

In a careful examination of the planning table for such an exercise, one can note a number of interesting details. Many crews are carrying out assignments for additional reconnaissance or are playing the role of the "enemy" which, incidentally, is sometimes simplified down to the point of ordinary level flight. Each participant in the training has an exercise corresponding to the mission but next to this is designated a second which is a LTU!

This is an obvious "sham." But it is accepted by the superior levels. After such an exercise, the unit or subunit is given the appropriate grade and the reports move up the chain of command on carrying out the task. After the first period of instruction the plan for LTU is often fulfilled. But only in terms of quantity. Quality moves into the category of "past" and this is very difficult to verify.

The time has come in assessing the results of the exercises to bear in mind the degree of their complexity as well as the quantity and up-to-dateness of the new employed tactical procedures. And if in this instance the commander has nothing to report, then it is legitimate to give him time to achieve the required commander maturity or raise the question of fitness for the position.

The true level of tactical skill in the units is often apparent only in inspections conducted by superior staffs. After such inspections certain commanders for a long time endeavor to depict the low grade as a result of certain accidents or unfavorable circumstances and do not seek out energetic ways for rectifying their style of work and thus actually show their unfitness for the held position. Are we not posing the question too harshly? No! Combat potential should become not only the limit but also the actually achieved combat might.

We cannot help but raise such a component of combat potential as combat readiness and which can both make up for the shortcomings of other components as well as amplify them. Here it is important to isolate in the essence of combat readiness that element which is frequently left in the shadows. For incomprehensible reasons many commanders reduce combat readiness merely to the times for entering battle. But certainly the most important aspect of it is to anticipate the enemy for such parameters as deployment of forces, commitment to

action, the organizing of the defense of the personnel against weapons of mass destruction and a constant ability to carry out unexpectedly arising tasks. For instance, if it is possible to anticipate the enemy in scrambling, and without even having numerical superiority in the air, we gain a tactical advantage. The exceptional importance of anticipating the enemy has an old history. This has been constantly confirmed in modern military conflicts. For this reason, combat readiness should, in the first place, be oriented not merely at times, but at constantly reducing them and secondly should be assessed on a real time scale. At one moment combat readiness may be reckoned in hours and after a few minutes in seconds; at one time it may require the scrambling of all forces and after a few minutes it will be very important to have at least two aircraft in the air.

It is not so difficult to provide a well-tried indicator but it is not easy to find a dynamic one because this must be constantly "recalculated," analyzed and forecast. Thus, at the LTU conducted in the course of inspecting combat readiness of a unit, its commander Lt Col G. Fokin by his decisions put the inspectors performing the role of the "enemy" in a very difficult position and during certain episodes "outplayed" them, as they say, completely. This was a result of the commander's creativity and non-routine thinking, and the confident and precise actions of subordinates developed by them over the entire training period.

Moral and organizational components also have their specific content in combat potential. For example, in the reports on the strengthening of military discipline, one sees only the compulsory aspect, that is, the commander's exactingness, hardness, firmness and so forth. But involuntarily the question arises: What sort of military discipline is this? It makes not sense asking about this because the answer will always be that it is so stipulated in the regulations. Here it is forgotten that the leading aspect of Soviet military discipline is constructive and not restricting but rather widening the range of the forces of the individual and the collective. In essence our discipline is a method of the interacting of people in carrying out a joint task. Then the possibility arises of concentrating the forces of the soldier or the collective on a clearly defined matter. But where the basic emphasis is on exactingness and harshness not backed up by effective indoctrinational work, instead of the expected strengthening of military discipline, disorder, a lack of organization and nervousness reign. For example, such leaders as Officers V. Vladimirov, V. Kayurov, N. Tabakov and V. Selivanov have not held back on reprimands. A majority of their subordinates has reprimands (and even several each) but such a style of work for the prescribed way of life in the collectives does not produce positive results.

A man by discipline on every undertaking saves both forces, nerves and time and reserves are obtained for self-improvement.

Moral and political aspects hold a special place in the system of combat potential. For example, in crossing the Dnieper in September 1943, one of the units held onto a bridgehead on the right bank of the river, driving off six or seven Nazi assaults. The moment came when the artillery troops had only two guns the loss of which meant death. The aviators in one of the fighter regiments were given the mission of preventing a single enemy bomb from falling on the bridgehead. In the evening the communists assembled to discuss how this task could be carried out. One pilot said: "If a Nazi breaks through to the bridgehead I will ram him. For certainty." Another pilot supported his comrade. On the following day both executed rams. Here it is legitimate to ask: Why out of the thousands of feats did we take up these? Only because the decision to carry out the ramming was taken by the hero pilots not in the heat of battle but on the eve, as a regular discussion of the procedure for carrying out the battle mission of the following day. This episode eloquently illustrates the high ideological conviction and our Soviet morality. The feats speak for themselves.

Only one other question might arise: Is it possible that such a level of personal moral and political valor can be achieved only in the crucible of a war, by grief and suffering and by the unhealing wounds to the soul suffered by the loss of combat friends, relatives and dear ones? No, it is not a war that gives such spiritual strength to the Soviet person but rather that patriotism which has always been and remains our strongest "supersecret" weapon which the enemies of our socialist fatherland cannot figure out let along reproduce.

The U.S. military-industrial complex and its allies in the aggressive blocs are constantly intensifying the arms race. To the thousands of aircraft they are adding thousands of cruise missiles and an active search is underway to militarize space.

But it is not a feeling of dejection and depression for which this entire military bacchanal is designed that arises in the hearts of the Soviet people. Infinite love for the motherland is our response to any aggressive preparations and aspirations of imperialism. This love is reinforced by the might of all the components of combat potential and a continuous improvement in this potential is both a moral-political need and a professional duty of each Soviet aviator.

10272

More Realistic Pilot Training Under Mountain Conditions Urged

91440049b Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87pp 4-5

[Article, published under the heading: "For High Combat Readiness," by Col B. Kuzenyatkin, military sniper pilot: "In a Mountain Desert Terrain"]

[Text] That night operations at the airfield did not halt for a minute. At the aircraft parking areas the ground specialists were readying the aviation equipment. From

time to time scouts headed into the skies. Intense work was underway to plan and organize the next day of exercises.

During the previous 24 hours the "enemy" had not achieved any noticeable success on the axis of the main thrust and toward evening was forced to go over to the defensive. It was to be expected that during the night it would create a defensive system with strong air defenses on the chosen line.

After working out and analyzing the data received from air and troop reconnaissance, the contours of a deeply echeloned defense began to become clear on the large-scale maps. The "enemy" in all probability was hoping to keep the prevailing heights, the passes and sections of mountain roads. Consequently, both the ground and the air subunits in the next few hours would be confronted by intense fighting against a well-armed "enemy" which in addition possessed a significant tactical advantage. However, the alarming thing was that information about the air defense system as obtained from the scouts was incomplete.

As the umpire under the commander of one of the air units I was to observe and assess the work of the crews in making air strikes against objectives located in the mountains.

At dawn we took off in a two-man trainer for the area of the forthcoming operations of the subunits. As we climbed the sky became brighter and brighter and finally bright sun rays shown over the horizon. However, below night still reigned in the mountains. After several minutes of flight, the light-pink snow-covered peaks appeared on the horizon. This was the area where in 10-15 minutes a crushing strike was to be launched against the targets of the mountain testing range. Below darkness gradually lifted and through the grey haze one could begin to see gorges, mountain streams, light areas of roads and the roofs of houses in the Central Asian villages. The "enemy" was located in one of the gorges.

We set into a turn, providing conditions to view the target situation. After several minutes a familiar voice sounded over the air waves. The air squadron commander, Maj V. Platonov, was reporting to the controller on the time and direction of the strike by his group as well as the altitude. Then again it was silent in the air. But the silence was deceptive. It was to be expected that the "enemy" would turn on full powered jamming. With uncoordinated actions by the crews, a loss of command in the groups was inevitable. Hence success in carrying out the battle task would depend upon the individual skill of each pilot.

In actuality, soon thereafter the air waves were filled with crackling and whistling. We switched to the alternate frequency and after a few seconds heard the call numbers of the crews. Having received a report from his wingman, Maj Platonov gave the command: "Get ready group!" and after this "Attacking on a course of 30."

In the gorge, through the shifting morning haze one could scarcely spot the landmarks, however Maj Platonov confidently reported: "On combat course, I see the target." The flight controller at the range permitted operations.

After the command of the leader "Launch!" we saw the streaks of the missiles and powerful bursts of explosions. The second and subsequent two-plane elements also acted confidently. For this sortie the squadron of Maj Platonov received an excellent grade.

After the strike, we moved to another area where two other groups were to launch successive strikes against tactical targets located in direct proximity to the forward edge of our ground subunits, having designated the air softening up for the assault.

The sun had already risen, when the group headed by Lt Col N. Izolevich arrived in the attack area. The targets were positioned 1.5-2 km from the line of trenches and could be rather well seen against the background of the surrounding terrain. In any event the impression was created that they would be successfully hit. In actuality, the flight led by the squadron commander covered the target precisely. But then the next flight did not succeed in operating against its targets as it should as the targets were covered by a cloud of smoke and dust from the bursts of the previous group's bombs. under the more difficult situation the group made several runs and was then forced to give way to other crews arriving at the range. They had to operate against alternate targets on a familiar range.

From an analysis of this episode, the question arises: Why did the pilots of one squadron carry out their task with an excellent under more difficult conditions and the other only satisfactorily? Was it due to the sniper strike of the first group? The answer to this question will come later. In talking with the pilots of both subunits it became clear that in the first squadron the entire personnel had already participated in launching bombing and strafing strikes against targets in mountain terrain while in the other only one flight of pilots had such experience. The commander of the second group did not choose the direction of the run against his target correctly while the leader of the third two-plane element was psychologically unprepared for operations close to his troops. Under the influence of the failure of the previous two-plane element, he searched for the target much farther away from the site of its actual location.

Thus, the reasons for the unsuccessful actions are obvious and the degree of blame of both the leaders and the wingmen was ascertained. Here it is important to point out that operating over the range were aviators whom we would not term young. They had served 3 or 4 years in

the regiment. Moreover, this unit had excellent opportunities for training as they were literally several-score kilometers from the mountain training range. And while the target set up at it did not always correspond to a real one, it did make it possible for the pilots to gain the skills essential for carrying out battle tasks under the conditions of mountain desert terrain. In putting it frankly, these skills are not always sufficient in operations under unknown conditions, nevertheless, experience does give confidence and psychological strength.

But why did the pilots making the flights on the mountain test range at times not always carry out the tasks of destroying objectives in a situation as close as possible to actual combat? Here there are many factors. Let us endeavor to examine these from our own experience.

...I remember the first sortie into the mountains as well as the introductory flight at the aviation school, so emotionally charged it was. The assignment at first seemed simple: to reach the assigned area, to detect the coordinates for the position of the "enemy" antiaircraft weapons and neutralize it before the approach of the strike group. Then we were to cover the group against the first of undiscovered or "recovering" air defense weapons. In actuality it was not so simple as the target was at an altitude of almost 3,000 m above sea level on the slope of a range which was crowned by several peaks from 5,000 to 6,000 m high. The position of the antiaircraft weapons was beneath a stone cornice and securely covered the entrance into a deep gorge where the garget to be destroyed was located.

Before the sortie we figured the possible variations of the attack and worked out a model of the flight from take-off to landing. Finally we decided on one variation: to launch the missile strike from a heading almost perpendicular to the strike of the range and by an energetic pull up to the right to avoid hitting the mountain which had a gradient of almost 70 degrees.

In the air the first to spot the target was my wingman, although I myself, as it seemed to me, had studied the terrain on the map backwards and forwards. In pulling out of the dive we had to switch on the afterburner, since at an altitude of 6,000 m the aircraft rapidly loses speed and does not sufficiently obey the controls. The missiles were launched a little earlier and, naturally, they exploded several meters from the target, without causing it substantial harm. The wingman hit the target. In pulling out of the dive I had operated the controls too abruptly and as a result the aircraft had gone into a high angle of attack and had dropped significantly. Using the afterburner I pulled out at the designated altitude and saw the strike group only after the first bombs had exploded as the color of the aircraft could be clearly seen against the background of the terrain. I had also chosen my position incorrectly as the group was approaching from the direction of the sun.

After this flight there were others which made it possible to conclude that for confident operations it was essential to have good training in piloting as well as navigation and orientation in the mountains. As a rule, targets in mountain terrain are determined by coordinates or, if it is possible, photomosaics are provided and it is essential to know how to use these in order to operate successfully in the mountains.

In the course of the LTU [tactical flight exercise] it is often necessary to cooperate with ground troops in direct proximity to them and with other air arms. Frequently this cooperation is very conditional and temporary. Also life forces us in certain instances to organize this cooperation, as they say, on the run. We have seen fighter bombers, ground attack planes and helicopters operating simultaneously in a limited mountain area with artillery troops on the ground. This has become possible due to the fact that in daily training the flight personnel has abandoned oversimplification while the principle of gradually complicating the situation in observing safety measures has produced high effectiveness. To put it differently, at a familiar range experienced pilots operate against ground targets in accord with assignments worked out considering the level of their training.

Weapons training is one of the foundations of the combat skills of an air pilot. A high level is achieved by a skillful varying of the tasks for the personnel and by training them to carry out the tasks initially in a simple tactical situation and then in an evermore complex one.

Our aviators have great experience in operating in mountain desert terrain. This experience did not come easily, at times at a price of failures and errors which could have been avoided if the flight personnel training system in practice had continuously taken into account what had been discovered in the course of scientific research, major exercises and maneuvers.

In my view, in the combat training of crews of frontal aviation, it is essential to provide exercises for working on individual and group actions under the conditions of mountain desert terrain. Here initially the opportunity should be provided of mastering individual and group piloting techniques under maximum conditions as well as navigating employing radio technical equipment as well as without this, that is, with the shutting off of this equipment on the ground.

Combat employment must be mastered together with the conducting of air reconnaissance and the employment of all types of maneuvers for attacking ground targets and aviation weapons of all types effective in the mountains. Experience shows that after developing teamwork in the actions of two-plane elements, flights and squadrons and after mastering the tactical procedures and the methods of seeking out and attacking ground targets, it is important for the flight personnel to continuously maintain skills in fire and tactical cooperation. This is aided by the successive conduct of LTU for the two-plane element,

the flight and larger groups against a background of the exercises and maneuvers of ground troops in cooperation with the tank and motorized rifle subunits, the rocket troops and artillery, the organic air defense weapons as well as with the other aviation arms.

In the course of tactical flight training a pilot should learn independently to search out the target, to determine its coordinates, to accurately launch bombing and strafing attacks and act precisely in the event of midair retargeting. We feel that it would be to the point to check the training of the crews at airfields located in mountain desert terrain for the questions of individual and group piloting techniques, combat maneuvering, navigation and combat employment at a mountain test range. Whenever possible the LTU of the subunits should be conducted against a background of combined-arms exercises in working through all types of cooperation and support. This, we feel, will provide a tangible increase in the combat skill of our crews and, consequently, raise the level of combat readiness in the aviation subunits.

10272

Greater Efficiency, Independence Urged in Aircraft Servicing

91440049c Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 6-7

[Article, published under the heading "The Decisions of the 27th CPSU Congress in Life!" by Lt Gen Avn V. Shishkin, Air Forces deputy commander-in-chief for the aviation engineer service and chief Air Forces engineer: "The Energy of Action for Restructuring"]

[Text] Restructuring! This is what presently comprises the essence of the diverse activities of the Soviet people in each sector, at each enterprise, at any institution working steadily to implement the quotas of the 12th Five-Year Plan, the key one in the program of acceleration. Over a short period of time, as is emphasized in the Appeal of the CPSU Central Committee to the Soviet People on the Occasion of the Approaching 70th Anniversary of Great October, it is essential to bring about a qualitative shift in the economy and create strong reserves for the future. The successful carrying out of this task demands from each person enormous effort, effective organization and great responsibility in work.

We are as yet in the initial stage of the restructuring, as is pointed out in the materials of the January (1987) Plenum of the CPSU Central Committee. The basic and most crucial work is still to come. We must steadily, step-by-step, and without hesitation move forward, we must soberly assess what has been done, we must promptly rectify mistakes, we must seek out and find new methods and procedures for carrying out the arising tasks, in advancing without fail toward the designated goals.

The activities of the personnel in the Air Forces aviation engineer service [IAS] to carry out the party decisions are getting underway evermore widely, although at times without sufficient effectiveness and purposefulness. Difficult and very important work is being carried out to determine the concrete approaches for each subunit and each troop collective and the ways of practical actions in accord with the over-all political line. The IAS specialists are conducting a constant search for forms and methods of active involvement in increasing the combat readiness of the Air Forces units and subunits, for ensuring flight safety and for strengthening discipline and organization.

In order to carry out these complex tasks, it is essential to see a clear future in the activities of each specialist. And this can be provided only by skillful planning. It is impossible to work without having a plan designed for an extended period and for a major success, pointed out V.I. Lenin. "Our party program," he said at the Eighth All-Russian Congress of Soviets, "cannot remain just the party program. It should be turned into the program of our economic construction, otherwise it is not suitable as a party program. It should be supplemented by a second party program, by a plan of work to recreate the entire national economy and bring it to the level of modern technology."

Life has confirmed the truthfulness of Lenin's ideas on socialist planning. The most complicated tasks are carried out according to a plan precisely and with optimum expenditures. Conversely, many difficulties arise out of failings in organizing planning. In pointing to the unresolved problems, the party at the present stage is demanding that the process of improving planning be carried out more quickly. Proceeding from Lenin's instructions, the demands of the USSR minister of defense and the commander-in-chief of the Air Forces, work has been carried out in the Air Forces IAS to optimize the planning system. Its improvement and closer tie of the long-term, medium-term and current plans with the urgent tasks confronting the aviation collectives are the goals which have guided us in this. Another important direction in the given problem is to eliminate formalism in planning and eliminate the haziness and unspecificness in the existing system of indicators. We must strengthen their focus and influence on end results and increase the importance of those which involve the priority goals of effective employment of training time, improving the quality of maintenance and repair on aviation equipment and the thrifty employment of resources, fuels and lubricants.

Without going into details, let us point out that such planning more completely and accurately sets the sequence and stages of effort, their scientific-procedural

and logistic support as well as strict control over the execution of the work. Certainly the most important is the realization of what has been planned in practice.

Only the deed presently serves as the true criterion of the restructuring. Only action, only practical work predetermine the success of carrying out the designated plans. During the time which has passed since the April (1985) Plenum of the CPSU Central Committee, one can clearly note substantial positive shifts in the activities of the Air Forces IAS specialists. The strengthening of order, organization and discipline was felt immediately in the work results. This is the reserve which, as they say, lies on the surface. As practice has shown, initiative and a creative attitude toward the job are becoming an evermore important part of the restructuring. The experience of the pacesetters shows that where there is a decisive turn in the work to the new and where the independence of the aviation collectives and all the personnel is developed as much as possible, the pace of progress is higher and the end results are better.

The IAS specialists from one of the guards formations have shown a professional and creative approach to the task of improving efficiency and ensuring dependable, trouble-free operation of aviation equipment. Here upon the initiative of Guards Lt Col B. Khan and Guards Capt A. Spirin, an analysis group was organized to detect possible failures and promptly carry out preventive maintenance on the radio electronic equipment. This group includes the best trained pilots and officers from the command post and the navigation and aviation engineer services. Even in the first months of work the group produced a positive result. It was possible to clearly classify the reasons for the certain instances of ineffective employment of fighter weapons, including: was this an error of the pilot in piloting, in operating the sight, was it an inaccuracy in the guidance of the aircraft or a failure in the operation of the radar sight. At the same time it became clear how to more effectively employ the objective monitoring equipment as well as what monitoring and check-out equipment should be on board in the flights.

When the group began working at full strength, it was possible to work out a system for collecting instrument information, a procedure for analyzing the data and reports as well as prepare recommendations for executors. The system worked out by the innovators proved effective. At present, it is being introduced in other units which operate analogous aviation equipment. In truth, this process is still going on with unjustifiable slowness.

Or the following example. Under the leadership of Officer P. Borodatov, one of the subunits has developed and manufactured a device for testing the integrity of fuel tanks without starting up the engines. This made it possible to save up to 150 liters of valuable aviation fuel on each aircraft, to reduce the time of inspections and improve their quality.

The given examples confirm that if each person will conscientiously carry out what he is entrusted with, if he shows a creative and involved attitude toward his job, there is no need to refer to someone, to seek out "objective factors" for ineffective work, mismanagement and waste or violations of production discipline.

An indispensable factor in successfully carrying out the tasks confronting the IAS personnel is military and production discipline. But discipline is instilled and indoctrinated by people, primarily those who because of their service position head the troop collectives. To a decisive degree the state of affairs in the units and subunits, the carrying out of prescribed requirements by the men and the observance of executor and production discipline depend upon the style of the leaders' work and their responsibility for indoctrinating subordinates.

Currently, a majority of the IAS leaders of the units and subunits have been persuaded that without careful and effective indoctrination of discipline and efficiency for the different categories of specialists, it is impossible to achieve the unswerving observance of the established rules for operating and overhauling aviation equipment.

The actual organizing of the activities of the personnel affirms the necessity of systematic planning for such work in all the IAS elements. For example, in the collective where the IAS is headed by Guards Maj V. Khabarov, it has become a practice to hold a monthly analysis of the state of production discipline. This has made it possible to work out more effective measures for an indoctrinational effect on the specialists considering the combat training tasks being carried out by them. Definite experience in this area has been gained in the aviation collectives where officers Yu. Grigoryev and M. Meleshko are the deputy commanders for the IAS. The careful study, generalization and introduction of this experience into the practical activities of the IAS should become a firm basis in the work style of the Air Forces leading engineer personnel.

Unfortunately, there are officers who in words are in favor of the restructuring but in fact are little concerned for broadening their ideological and theoretical viewpoint, for increasing professional skill, for improving their work style to bring it into accord with the demands of the times. An uncritical attitude toward the methods and results of one's work, complacency and smugness lead to a situation where the shortcomings in the activities of such IAS leaders become deeply rooted, they tell negatively in practical matters and lead to errors and serious omissions in readying the aviation equipment for flights as well as in the course of the flight operations shifts.

For example, certain IAS leaders do not try to personally inspect a final time the state and preparation of the aviation equipment, fearing that they would insult an experienced specialist and that he would view this as an

expression of excessive interference and lack of confidence. But such officers are profoundly wrong as the inspection of a demanding and just superior, conversely, forces one to work even better and with greater responsibility. Hence, a personal inefficiency on the part of one or another IAS leader, as a rule, causes great harm to indoctrinating the specialists and damages the common undertaking.

Life has shown that without constant self-inspection, without careful self-analysis and a critical attitude toward one's service activities, without creative initiative and a new approach to the job, the squadron deputy commander for IAS presently cannot hope that in time he will become a mature, experienced and promising leader of the unit IAS.

It is hard to overestimate the role of this category of IAS officials in the question of increasing the unit's combat readiness, intensifying combat training and ensuring flight safety. The unit deputy commander for IAS in practice acts as an organizer and indoctrinator, an administrator and an engineer, and the successful interaction of the engineer and technical personnel with specialists from other services depends upon the style of his work. His competence, creative activity, the ability to work with others, sensitivity for their needs and requests and a personal example in service and everyday life inspire subordinates to unstinting military labor and bring a tangible return.

The IAS officer leaders A. Arkatov, V. Aksenov, Ya. Belbovets, A. Glazov, Yu. Kasha, A. Melnikov, A. Rozmaritsyn, V. Stupakov and V. Khaver have proven to be active proponents of the new, capable of actually surmounting the existing stereotypes of thinking and action. Political maturity, responsibility, principledness and party loyalty help them carry out in life the party's decisions in the assigned area and bear high the title of aviation engineer. In working under the leadership of the commander and relying on the party and Komsomol organizations, they ensure the successful execution of difficult tasks assigned to the IAS personnel and set an example of working in the new manner. In any event. The communist IAS leader should be an organizer in restructuring service activities of his subordinate aviators. The first experience of this work shows that a feeling for the new and high responsibility for the assigned job are more quickly established where the IAS leader himself has mastered these qualities. This is manifested primarily in deeds and actions, in the ability to ensure and maintain precise and well-coordinated work of the men in the assigned area and objectively, exactingly and principledly assess the results of both his own work as well as of subordinates.

The task is to make the experience of the pacesetters universally available and on this basis raise the work of the engineer and technical personnel of the Air Forces to a qualitatively new level. It is no secret that we frequently still encounter a situation where progressive methods and forms of work do not always bring about a high end result.

What impedes certain collectives from following the path of modernization and achieving significant changes in their activities? There can only be one answer: the force of inertia and the habit of working in the old manner. It is essential to fight stubbornly for the restructuring. Unfortunately, not all the unit IAS leaders are pacesetters of the new and the advanced. There are those who because of insufficient service experience and knowledge, a lack of personal example and most importantly, low demands on themselves, are unable to mobilize subordinates to carry out the set tasks effectively. Such leaders must be promptly helped. But this help should not be turned into excessive interference. It should also provide rigid demands on the officer leaders for the end results of the work.

Such demands can be rightfully leveled against the unit IAS leaders, Officers V. Polyakov and A. Tomko. Those shortcomings which were detected in the work of the collectives headed by them cannot be but linked to primarily the inability and at times the reticence of these officers to work in the new manner, in a spirit of today's demands.

The restructuring is an inseparable concern for each person. It presupposes a development of initiative, professionalism and independence of the IAS specialists and all aviators. Concrete deeds are required. The return from the new approaches and from the increased responsibility of the men should be manifested in the results of the summer training period and in carrying out the tasks of the training year, the year of the 70th anniversary of Great October. To fulfill the combat training plans and the socialist obligations completely and effectively and to work for a strengthening of discipline and a reduction in accidents mean to take practical steps in implementing the ideas of the January (1987) Plenum of the CPSU Central Committee and to embody the historic decisions of the 27th Party Congress.

10272

Greater Concern for Flight Safety Urged in Military Air Transport

Role of Party Activities

91440049d Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 8-9

[Article, published under the heading "The Traveling Editorial Office of the Journal AVIATSIYA I KOSMONAVTIKA," by Lt Col N. Antonov and Col A. Dmitrichenkov: "Flight Safety: Steps in Restructuring"]

[Text] [Editorial Introduction] The guards aviation regiment of military transport aviation [VTA], where Guards Lt Col N. Kolosov is the deputy commander for

political affairs, is famous for its combat traditions. During the years of the Great Patriotic War, the regiment's personnel covered itself with undying glory. The guardsmen aviators of the current generation are successfully mastering the complex modern aviation equipment and are skillfully carrying out the assignments of the command. During the current training year, the year of the 70th anniversary of Great October, the pilots, navigators, engineers and technicians are working with particular zeal. They are obliged to do this by the title of initiators in the socialist competition among the VTA units. The obligations assumed are intense but realistic and feasible. Extensive work is being carried out in the regiment to prevent flight accidents and potential accidents and to ensure flight safety. The unit's party organization and the procedural council are taking an active part in this.

Recently the traveling editorial staff of the journal studied the state of affairs in the regiment. We publish below the report of our special correspondents, Lt Col N. Antonov and Col A. Dmitrichenkov.

[Article Text] A little more than a year has passed since we visited this regiment. It is a familiar garrison and with familiar personnel. At first glance, probably nothing has changed here. But what happens if one looks deeper? What is the state of affairs as a whole?

From a talk with the chief of the political section we learned that the previous year had not been an easy one for the personnel. And although the regiment received a rather high evaluation at the final inspection, nevertheless it cannot be said that the questions of combat training, the ensuring of flight safety, the strengthening of military discipline and a number of others were completely resolved. At present, the chief attention of the command, the party organization and the entire collective is concentrated on them. Primarily the problems isolated involve the ensuring of flight safety. In resolving these a major role is played by the party committee headed by Guards Lt Col Yu. Leonov.

At the start of the year, at a party meeting the regiment's communists discussed in detail the tasks for ensuring safe flight operations. Chief attention was given to the discipline of the flight and technical personnel on the ground and in the air. At that time the communists recommended that the party committee go more deeply into these questions and take effective measures to eliminate the shortcomings.

In carrying out the decision of the meeting, Guards Lt Col Yu. Leonov and the other party activists studied in detail the work of the squadron party bureau, where Guards Maj P. Klementyev is the secretary, having paid special attention to indoctrinating in the young aviators a feeling of personal responsibility for executing each flight mission. They also checked how the communist leaders of the subunits and the party group organizers know the demands of the documents regulating flight operations, whether they efficiently inform the party bureau on the positive experience of the crews in executing flight assignments and the shortcomings, and analyzed what measures are being applied to the violators of the laws of flight service and what is their effectiveness.

Later these questions were brought up at an enlarged session of the party committee. Invited to this were the secretaries of the party organizations, the subunit commanders, their deputies and the officers of the regiment's headquarters. The discussion was sharp and impartial. The communists in a principled manner brought out the shortcomings in ensuring a party influence on the observance of the flight rules and made a number of proposals. For example, it was decided to pay more attention to the leadership group. Often in executing flights the group was left without a party influence although it did have a party group organizer who should have intensified his work to a maximum precisely during this period. The communist leaders in the regiment were recommended to show a more principled approach also to classifying potential flight accidents.

Generally speaking, the careful and thorough analysis of the state of affairs and the thorough preparations for the party committee session produced good results and made it possible to solve a number of questions in improving work to guarantee flight safety.

However, it is a rather long distance from the taking of a decision to fulfilling it. The party committee members supervised the affairs in the subunits. In going into the work of the squadron party organization where Guards Lt Col A. Nikitin is in command, they concluded: here measures related to flight safety are not sufficiently planned and carried out and there was very little on flight discipline. At a session of the party committee they heard the squadron commander on how he was directing the work of the party organization at strengthening flight discipline. Other communist leaders were invited also to the session. It must be said that some felt very uncomfortable, as they realized their own oversights. On the other hand, the hearing showed that it is essential not only to promptly pose demands but also to learn and to help. For this reason, soon thereafter instructional-procedural exercises were planned and conducted with the squadron and detachment commanders and here they analyzed in detail the question of how to correctly direct the work of the party organization on the question of raising flight safety.

Upon the initiative of the party committee, a special commander's day was conducted in the unit and this was devoted to maintaining flight discipline on a high level.

As is known, the assessment of any job is its final result. In the winter training period, no flagrant violations of flight discipline were recorded. We feel that this success here was largely due to the activities of the party organizations.

Nor did the party committee overlook the specialists of the aviation engineer service [IAS], particularly as there were complaints about them. The unit did a good deal to systematize the methods of preliminary, preflight and postflight preparation of the aircraft. But still certain problems remained: formalism and sham instead of a painstaking practical organization of the work and efficient inspection, the slow introduction of the proposals of the communists to improve the work schedules for readying the aviation equipment employing a reduced number of specialists, shortcomings in the supply of certain spare parts, a poor system of inspection over the work done and a lack of systematic propaganda of the advanced experience of the best aviation specialists.

These questions were brought up at a session of the party committee. The communist leaders of the regiment were also invited. Again the discussion was business-like and for many impartial. There were some who behaved in the old way, who wanted to close their eyes to the existing problems and endeavored to depict everything in a rosy light, referring to supposedly objective difficulties. The party committee members subjected such a position to harsh criticism.

"It is not enough, comrade engineers, that you are working with people," said the regiment's commander then. "It is your obligation to resolve technical questions but also responsibility for the actions of subordinate aviation specialists rests on you."

Other critical comments were also voiced, and proposals made to improve the work of the IAS specialists and increase production discipline. Thus, considering the great positive effect from the reporting of the communists at the party committee, they recommended employing this form of work also by the party bureau. Soon reports were heard by Officers A. Muravlyannikov, S. Kuzmin, N. Larionov and others.

At present, the communist leaders of the IAS bear responsibility for the actions of each specialist. For example, previously the regiment's engineer for aviation equipment, Guards Maj A. Lopashinov, was responsible only for his immediate assistants. If any of the specialists of this service committed a disciplinary infraction or an error in work, it was felt that the subunit commander or the deputy commander for political affairs was responsible for the oversight.

Now, as was already said, the situation has changed. Lopashinov is no longer an outside observer, but rather an active participant in the entire process of training and indoctrinating specialists for aviation equipment. He supervises their training and the quality of the jobs performed and goes into the needs and concerns of the aviators. As a result, the number of infractions of production and military discipline has declined by almost 30 percent and the reliability of servicing the aviation equipment has risen. The same can be said about the subordinates of Guards Maj P. Krivinyuk and about others. This is the human factor in action!

It must be recognized that the restructuring is pushing deeper and deeper into the life of the unit's aviators. It has broken the mechanism of inhibition and is working toward acceleration. The moral atmosphere in the collective is also becoming purer.

"In the regiment there has been a significant reduction in the number of potential accidents caused by the personnel and also the number of major infractions of troop discipline, although the demands on the men have become stricter," said the deputy regimental commander for political affairs, Guards Lt Col N. Kolosov. "Why? I think primarily because the party organization has succeeded in touching the hearts of the communists and a predominant number of the aviators with the idea of modernization and changes and shifting the center of gravity to practical work. Deeds and not words are now the main thing for us."

Yes, there are substantial changes both in the deeds and in the awareness of the regiment's aviators. But still this is only the beginning of the path of restructuring. It would be incorrect to assert that here everything is going on, as they say, without hitches and problems. There are shortcomings and a number of them. Among the main ones one would mention the poor influence of the party organization and in particular the party committee on ensuring the personal example and responsibility of the communists for the high quality of flight operations. The party organizations do not always show proper principledness in determining the effective causes of one or another potential accident and often tolerate overstated evaluations in flight training. Characteristic of individual communists are drops in the struggle for flight safety and the replacing of this by general appeals and admonishments. In order to be convinced of this, one has merely to look at certain minutes of bureau meetings where there are few concrete, professional ideas and proposals.

The reverse also happens: the communists say correct things, they make useful proposals but themselves quickly forget this. For example, Comrades N. Larionov and N. Gureyev in words were in favor of strengthening executive and production discipline but in fact undertook little in this area. Another example: the decision of the party committee to strengthen the responsibility of the communists for readying the aviation equipment on the eve of flights was immediately carried out only by the squadron party bureau, where Guards Maj P. Klementyev is the secretary. The remainder hesitated for a long time.

The party committee pointed out that certain communists, detachment commanders and deputy squadron commanders are not sufficiently involved with the personnel in studying the procedures for carrying out the

flights. Much was said last year and now they are talking about the need to hold exercises on flight dynamics with the senior in-flight technicians. But the changes have been insignificant. At a meeting of the regiment's communists devoted to the questions of ensuring flight safety, they criticized the work of the section on moral and psychological training. It was pointed out that a predominant majority of the potential air accidents was detected by personnel from the flight control group and by the unit's leadership while the subunit commanders did not take a sufficiently active part in this work and made little use of the materials from the instrument monitoring. These problems exist at present but the party committee has done little to hold persons responsible for the shortcomings.

There are problems where the party committee as yet has not delved properly into solving them. For example, improving cooperation with the obato [separate airfield technical support battalion].

From the given examples it can bee seen that the unit's party committee must obviously strengthen supervision over the execution of its decisions, go more deeply into the affairs of the subunit party organizations and not merely record shortcomings but help in eliminating them.

Many communists were heard at the party committee and bureau sessions. This has provided basically good results. But, we feel the effectiveness of the reports could have been higher if the men would have reported at the meetings.

Life shows that party work in the area of improving flight and production discipline does not end with the holding of merely sessions and meetings. Here there must be a system of organizational activities which includes a range of measures. As of now one might say that the measures exist but a flexible and completely effective system has still not come into being.

The party should not stand on the sidelines in resolving personnel questions. This demand of the January (1987) Plenum of the CPSU Central Committee has yet not been fully implemented. From talks with the men and with the communist leaders it is apparent that the party committee still has little influence on the recruitment and placement of personnel and supervision of their activities is insufficient.

As we can see, the party committee and the entire party organization possess reserves. These are in greater independence and aggressiveness. To restructure in a spirit of the demands of the times means to have a more active and effective party influence on the shaping of ideological strength, the professional skill of the personnel, on strengthening military discipline, ensuring flight safety and raising combat readiness. This is the main area of party work at present, the area of the party committee's activities.

Work of Procedural Council

91440049d Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 10-11

[Article by Lt Col N. Antonov and Col A. Dmitrichenkov: "The Methods Should 'Work'"]

[Text] While the term "school of combat mastery" has become established for tactical flight exercises [LTU], procedural training in the guards aviation regiment is aptly called a university of military theory and practice. In actuality, the unit has been able to achieve a unity of views concerning the organization of the training and indoctrinational process and for the effective use of the training facilities, for working out and employing new procedures for further improving the flight skills of the crews.

The procedural council is the unique staff in this area and its authority in the unit is very high. This is determined primarily by its membership. The procedural council includes the officer leaders, the most experienced instructors and the best subunit specialists. In each specific instance they competently analyze the disputed questions, together they take correct decisions and provide the necessary recommendations for improving the quality of crew combat training.

The procedural council gives particular attention to ensuring flight safety. Certainly it is well known that without the scrupulous observance of the flight service laws and without effective and proper preventive work to eliminate any errors on the ground and in the air, it is impossible to achieve high end results in combat training. For this reason at present, in the course of the restructuring, the regiment's procedural instructors have increased their creative activities.

What is noteworthy in the work of the unit's procedural council in ensuring flight safety? This is primarily an intolerant attitude toward shortcomings in combat training, a profound analysis of the committed potential accidents, and the constant introduction of advanced procedural developments and recommendations into flight practice.

All four sections of the procedural council—flight, engineer-technical, combat control and moral-political and psychological training—work in accord with an annual plan in a situation of the free exchange of opinions and a business-like discussion of questions. At the monthly meetings specific tasks are set out, the most rational ways and methods of implementing them are defined. The section leaders, Guards Lt Cols A. Narbutas, A. Muravlyannikov and N. Kolosov and Guards Maj G. Gorbachev endeavor to so organize things that all the personnel knows of the recommendations and decisions of the procedural council and that they are unfailingly

carried out. Openness ["glasnost"] and supervision have become for the aviators an effective means for improving the efficiency of the conducted preventive measures.

At one time the regiment was concerned for the air skills of the young aircraft commanders. Due to the fault of some of them, potential flight accidents had occurred. The flight section was concerned with an analysis of their causes. Having studied as they should the state of affairs in the subunits, the experienced procedural specialists concluded that this category of air personnel did not have sufficient skills. It was a question of a lack of training and certain personal qualities of the aviators.

The analysis of the causes and the procedural conclusions were followed up by concrete recommendations. Considering these the unit issued an order on training reserve aircraft commanders from among the most promising pilots. At present, Guards Sr Lts V. Glazkov, A. Luzgan, V. Kovalenok, A. Ivanov and Yu. Golubtsov are training for a level higher than the position held. Two instructors have been assigned to each of them. Thus, Guards Maj A. Antonov and Guards Capt V. Myltsev work with V. Glazkov, while Guards Lt Col A. Nikitin and Guards Maj Ye. Andrushkevich work with V. Kovalenok. Other experienced pilots with great responsibility and skill indoctrinate the qualities of future commanders in the youth.

Although the very posing of this question does not contain anything particularly new, the regiment was able to cause the detachment and squadron commanders to show greater care in selecting capable young aviators as well as freshen their training procedures. Concern for the qualitative "commander pool" has produced positive results. Now the regiment does not worry to whom they can entrust the crew of an aircraft. The level of commander training has risen as a whole and the number of potential accidents has been significantly reduced.

It would not be an exaggeration to say that organizational work by the procedural council has become the basis for preventive measures to ensure an absence of accidents in the regiment. In being concerned with their elaboration, the procedural council has carefully studied the facts, conditions and circumstances whereby violations of the flight rules have occurred, it investigates their causes and endeavors to anticipate possible consequences. With equal care it analyzes the miscalculations which do not create a direct threat to flight safety but indirectly influence its security. Here they take into account what categories of flight personnel have violated the flight rules and in what crews, subunits and services mistakes have been repeated for the same causes and so forth. The analysis is made from different positions depending upon what the members of the council wish to establish, analyze, confirm or reject. The comparing of facts, causes and circumstances provides an opportunity to draw correct conclusions and sound forecasts.

An analysis of the shortcomings in flight operations together with an analysis of the reasons of potential accidents makes it possible to detect the weakest elements in organizing the training process, in flight control and in flight execution and hence to determine specific measures which must be undertaken to eliminate the main and ancillary reasons for the errors. In working out such measures the procedural council, as a rule, calls in experienced specialists from the different services as well as officers involved in organizing the flight operations shifts.

Many valuable recommendations have been introduced into practice by common effort. For example, the procedures "preparing the crews to carry out flights under the established weather minimum," "the procedure for preparing the flight personnel and aviation equipment for executing flights under instrument landing conditions," "the methods of developing the mental functional reliability of crew members in executing complex flight elements," "the practical employment of sight and navigation equipment depending upon the sighting methods" and others.

The regiment's procedural specialists are basically concerned with working out recommendations and adjusting the training procedures for specific exercises provided by the program. But they do not restrict themselves to just this. When the necessity arises of effectively intervening in solving a suddenly arising problem, their involvement is considered indispensable. The members of the procedural council are always ready to help any aviator, they work without any regard for their other service concerns and endeavor to investigate hot on the heels into the essence of one or another question and effectively rectify the situation.

At one time, Guards Sr Lt A. Ilyasov during the day under instrument flying conditions, in approaching the landing, dropped prematurely and passed over the end of the runway at an unacceptably low altitude. Although he landed the aircraft safely, the fact remains a fact that there had been a potential air accident.

"What happened?" they then asked Ilyasov.

The officer shrugged his shoulders in perplexity saying that he had done everything as he had been taught. One could not rebuke the pilot for insincerity. Ilyasov was a scrupulous and disciplined man. Had the weather changed? Such an argument also was dispelled. It was not necessary to wonder any longer. It turned out that the blame for the entire error lay in the procedure for training young aviators to choose the point where they began to level out the aircraft.

Upon the recommendation of the procedural council, the subunit commanders conducted exercises with the flight personnel on calculating a safe altitude of flight and landing approach. The detachment commanders were told of the necessity to more effectively and visibly

teach the young pilots to correct assess the landing conditions and take the correct decisions. In the procedural studies now they have clearly defined the evaluation criteria for the actions of the pilots in landing as well as the concrete altitude for passing over the end of the runway.

These and other measures show primarily that the regiment's procedural council shows a tendency for a principled approach to the questions of ensuring flight safety.

The unit gives a great deal of attention to supervising the execution of the recommendations of the procedural council. A small group of aviators, as a rule, is engaged in making teaching aids, procedural diagrams and instructions. In the minutes of the sessions of the procedural council approved by the unit commander, without fail they indicate who is leading these specialists and the time for completing the job. Such concretization significantly increases the responsibility of the executors.

The members of the procedural council know their work areas and the men well. For eliminating certain shortcomings, the council chairman or a section leader gives an individual assignment to one of the experienced officers. Thus, Guards Maj A. Kruk improved the system for alerting the personnel while Guards Lt Col A. Burlakov worked out procedural recommendations for navigator service. In a word, the members of the unit council endeavor to involve as many specialists as possible in the struggle for flight safety. The members of the procedural council, as we see, have many good deeds to their score. They have an established reputation of enterprising, principled and creative men. They constantly seek out ways for accelerating the process of restructuring procedural work in the regiment.

At the same time, practice shows that certain good intentions of the council members at times are not reinforced with actual deeds. For instance, one can hear the following complaints. To restructure means to train better the pilots, engineers and technicians, as well as to strengthen combat readiness, organization and discipline. All of this is correct. But didn't these demands exist previously? Didn't such tasks confront the aviators before? Of course they did. But were they effectively carried out? According to the admission of the aviators themselves, not always. However, here this was tolerated at times. Now the time has come to report fully for the specific end results. Only under such conditions can the contribution of the unit's council members to the common undertaking be more marked and imposing.

In line with this we would like to mention the following. The procedural council still has many unused reserves for more effectively resolving the problems of ensuring safe flying. The regiment does not always see the germs of positive experience. What can explain this? Most frequently by inertia and by the indifference of individual council members. Certainly the introduction of the new and advanced requires at times a decisive break with existing stereotypes and for this it is essential to expend physical and moral forces and show creativity.

The effectiveness of the work done by the procedural council would rise by many-fold if all its recommendations were carefully thought out, sound and more concrete.

In examining the logs with the minutes of the section sessions, we frequently encountered such notations: "to carry out the procedural studies on improving the accuracy of navigation and landing troops," "training of personnel of the command post team...." Advice was also encountered: "restudy...," "give practical recommendations on the question...," "examine the question..." and others. Such recommendations, of course, oblige no one to do anything and consequently do not have an official impact. There are certain other flaws in the work of the procedural council. To the honor of its members, they do not seek justification for the shortcomings, they do not refer to "objective" causes but are fully determined to improve in their work.

"We see our task," said the leader of the section for organizing combat control, Guards Maj G. Gorbachev, "in accord with the demands of the restructuring, to constantly and effectively seek out unused reserves for improving the training and indoctrination process and ensuring flight safety...."

The other council members also have a similar professional stance. This, as is known, is a dependable guarantee that the procedural work in the council will improve steadily and the creativity of the innovators will gain strength in the name of further improving the unit's combat readiness.

10272

Calculator Employed in Calculating Fighter Oblique Loop

91440049e Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 19-20

[Article, published under the heading "Pilot and Computer," by Maj Yu. Maykov, military pilot 1st class: "An Oblique Loop With the Aid of a Programmable Microcalculator"]

[Text] Being in a disadvantageous tactical position, Capt A. Sinitsin was forced to employ a defensive maneuver. In order to escape from the attack of the pair of "enemy" fighters attacking him, it was essential to execute such a maneuver which would permit him to maintain practical cooperation with his wingman and create conditions for

going over to the attack. Having given the command to his wingman to execute a wind-up banked turn, he put his aircraft into an oblique loop, intending to strike the "enemy" from above.

But, in piloting the aircraft with arbitrarily selected parameters and in not adhering to the model of combat worked out, the leader was unable to carry out his tactical plan. The maneuver was ineffective and the counterattack did not succeed.

...Sr Lt A. Aleksandrov was given the task of attacking straight-in a mechanized "enemy" group which had been detected by scouts and destroy the command, control, communications and air defense equipment. Having calculated the necessary parameters of the maneuvers for attacking ground targets with the coming out on reference points, theflight's pilots precisely implemented the plan worked out on the ground, the pairs attacked the designated targets by surprise and destroyed them with heavy fire.

Experience shows that success in carrying out a set task is achieved by pilots in the instance that they have a clear understanding of the model of the planned maneuver and its parameters and skillfully execute these in piloting. A programmable microcalculator makes it possible to increase the precision of the calculations. In the given examples the military pilots employed an oblique loop and an "over the shoulder" combat turn and the programs for calculating the parameters of these for constructing their trajectory (a combat turn to turn the aircraft by 180 degrees) are set out below (for a MK-54 [microcalculator]).

As is known from flight dynamics, the movement of the aircraft's center of gravity in an inclined plane is described by the equations:

$$\frac{dV}{dt} = g(n_x - \sin\Psi\cos\mu), \quad \omega_{pl} = \frac{d\mu}{dt} = \frac{g}{V}\left(\sqrt{n_y^2 - \cos^2\Psi} - \sin\Psi\cdot\cos\mu\right),$$

$$V_y = \frac{dH}{dt} = V\sin\Psi\cdot\sin\mu,$$

where n_x — longitudinal g-load;
Ψ — angle of inclination of oblique loop plane;
μ — current angle of turn of trajectory in oblique loop plane;
ω_{pl} — angular velocity of displacement of aircraft center of gravity in inclined plane;
n_y — normal g-load;
g — free-all acceleration.

Let us add the angle constraint equations:

$$\sin\Theta = \sin\Psi\cdot\sin\mu,$$

$$\cos\gamma = \frac{\sin\Psi\cdot\cos\mu\cdot\sqrt{n_y^2 - \cos^2\Psi + \cos^2\Psi}}{n_y\sqrt{1 - \sin^2\Psi\cdot\sin^2\mu}},$$

where Θ — trajectory angle of incline;
γ — bank angle.

Let us assume that the controlling function $n_y = f(\mu)$ is known and the second n_x is given in an implicit form, that is, by the operating condition of the engine (for example, full afterburner to an angle $\mu = 180°$, then maximal).

The equation for the movement of the aircraft's center of gravity must be written in a form convenient for programming:

$$\delta t_i = \frac{\delta\mu_i}{\frac{g}{V_{i-1}}\left(\sqrt{n_{yi}^2 - \cos^2\Psi} - \sin\Psi\cdot\cos\mu_{i-1}\right)},$$

$$\delta V_i = g(n_{xi} - \sin\Psi\sin\mu_{i-1})\,\delta t_i, \quad V_i = V_{i-1} + \delta V_i,$$

$$\delta H_i = V_{i-1}\cdot\sin\Psi\cdot\sin\mu_{i-1}\cdot\delta t_i, \quad H_i = H_{i-1} + \delta H_i,$$

$$\sin\Theta_i = \sin\Psi\cdot\sin\mu_{i-1},$$

$$r_{tp} = \frac{V_{i-1}^2}{g(A-\sin\Psi\cos\ \mu_{i-1})},$$

$$\gamma = \arccos x \left(\frac{\sin\Psi\cos\mu_{i-1}A+\cos^2\Psi}{n_{yi}\sqrt{1-\sin^2\Psi\sin^2\mu_{i-1}}}\right),$$

where $A = \sqrt{n_{yi}^2-\cos^2\Psi}$.

Since the controlling function is given implicitly, then for determining it it is essential to employ the dependences:

$$g = \frac{\rho V^2}{2}; \quad C_{gp} = G/gS; \quad C_y = C_{gp}\cdot n_y;$$

$$C_x = C_{x_o} + AC_y^2; \quad Q_x = C_x gS; \quad n_x = P-\theta_x/G.$$

It is better to make up the program for determining the parameters for the aircraft's movement in two stages. In the first, all the parameters are determined needed for constructing the flight trajectory and in the second a program is compiled for determining the angles of bank and incline of the trajectory at each step corresponding to the first program.

For the initial data in the PMP [programmable microcalculator], the following registers are assigned: P0, P1, P2, P3, P5, P6, P7, P8, P9, PA, PC. The registers P4, PB and PD are on-line.

The program for calculating the parameters for an oblique loop ("over the shoulder" combat turn) has the form:

00.IP0 01.IPC 02.÷ 03.P4 04.FX^2 05.x 06.2 07.3 08.x 09.2 10.÷ 11.PD 12.F^1/X 13.IP1 14.x 15.IP7 16.x 17.FX^2 18.0 19.· 20.2 21.5 22.x 23.IP6 24.+ 25.IPD 26.x 27.IP9 28.↔ 29.-- 30.IP1 31.÷ 32.PD 33.IP7 34.FX^2 35.IP2 36.Fcos 37.FX^2 38.-- 39.F√ 40.IP2 41.Fsin 42.IP3 43.Fcos 44.x 45.-- 46.IP8 47.x 48.IP4 49.÷ 50.F^1/X 51.P9 52.1 53.5 54.x 55.5 56.7 57.· 58.3 59.÷ 60.PB 61.IPA 62.+ 63.PA 64.IPD 65.IP2 66.Fsin 67.IP3 68.Fsin 69.x 70.PD 71.-- 72.IP8 73.x 74.IPB 75.x 76.IP4 77.+ 78.IPC 79.x 80.P0 81.IP4 82.IPD 83.x 84.IPB 85.x 86.IP5 87.+ 88.P5 89.1 90.5 91.IP3 92.+ 93.P3 94.IP4 95.IP9 96.x 97.C/P

Instructions for the program are:

1. F PRG, input program, F ABT.

2. Input into registers: V_o (km/hr) in P0; G (kg) in P1; ψ(degree) in P2; μ_o(degree) in P3; H_o (m) in P5; C_{xo} in P6; g = 9.81 m/sec in P8; t_o (sec) in PA; 3.6 in PC.

3. To determine from graph P = f(V) for corresponding altitude of flight and speed the designations of P (kg) and input in reg. P9, from the graph of the controlling function (table) to determine $n_{y_{set}}$ and input in reg. P7, from the table of standard atmosphere for the corresponding altitude H_i, determine ρ and input into reg. X.

4. B/O, C/P, results in registers: r_{tpi} (degree) in X, V_i (gm/hr) in P0, H_i (m) in P5, t_i (sec) in P/A.

5. For determining the parameters in the subsequent step, move to point 3. The calculation ends with the turning of the aircraft by an angle of 180 degrees for a combat roll or by 360 degrees for an oblique loop. The calculating time of one step is ≈37 sec.

Note. For maintaining the value $\rho = f(H)$ input directly by calculation in reg. X, the properties are used for the displacement of information in the registers of the on-line stack.

Example. The initial data: V_{BB} = 1000 km/hr, G = 8000 kg, ψ - 45°, H = 1000 m, C_{x_o} = 0.017, n_{y_1} = 3.5, ρ_o = 0.1134 kg sec^2/m^4 (H = 1000 m), t_o = 0, μ = 0.

Step 1: R_o = 7000 kg, n_{y1} = 3.5, ρ_o = 0.1134 kg sec^2/m^4, (μ_o = 0).

Results: In reg. X -- 2890.9596, r_{tp1} = 2891 m; in reg. P0 -- 1040.1893, V_1 = 1040 km/hr; in reg. P5 -- 1000, H_1 = 1000 m; in reg. PA -- 2.7244656, t_1 = 2.7 sec.

Step 2: P_1 = 7000 kg, n_{y_2} = 5.0, ρ_1 = 0.1134 kg sec^2/m^4, (μ_1 = 15°).

Results: In reg. X -- 1994.5969, r_{tp2} = 1995 m; in reg. P0 -- 1040.2778, V_2 = 1040 km/hr; in reg. P5 -- 1095.5593, H_2 = 1096 m; in reg. PA — 4.5315637, t_2 = 4.5 sec.

..Step 4: P_3 = 6900 kg, n_{y_i} = 5.0, ρ_3 = 0.112, (μ_4 = 45°). Results: $r_{tp\,4}$ = 1874 m, V_4 = 1009 km/hr, H_4 = 1522 m, t_4 = 8 sec.

In order to construct the trajectory of the oblique loop in its plane of execution, the method of V. Vetchinkin is employed. On the drawing the initial point of the aircraft's center of gravity 0 is noted as well as the direction of the speed V_o at an angle μ_o to the horizon. From the normal to the trajectory at point 0, one lays off the amount of the radius r_{tp} calculated for the first step of integration. Then from the

center O_1 one draws the radius r_{tp_1}, the arc 0 — 1 which ties together angle $\delta\mu$. In an analogous manner the arc 1 — 2 of the trajectory and so forth are constructed.

Notes: 1. In the given program, the angle has been set $\delta\mu = 15°$. When necessary its value can be changed (within the limits of two digit places), and the lower the value of $\delta\mu$, the more accurate the trajectory of the movement of the aircraft's center of gravity will be executed.

2. The program employs a value of the wing area S = 23 m². If the value of S is greater than two digits, then it is necessary after inputting the initial data P = f(V,H) and n_y according to point 3 of the instructions, to input the value of the wing area S in register Y (that is, SB↑), after which the value of ρ is to be input in reg. X and go on to point 4. Then in the program, after the address 05.x it is essential to move on to the address 08.x, that is, to shift the program by two addresses to its start.

In the program the amount of the coefficient of inductive resistance A = 0.25 has been recorded. Addresses 18, 19, 20 and 21 correspond to it.

For determining the current value of the angles of bank γ and inclination of the trajectory θ, the program appears as follows:

00.P7 01.FX² 02.IP9 03.Fcos 04.FX² 05.— 06.F√ 07.IPA 08.Fcos
09.x 10.IP9 11.Fsin 12.x 13.IP9 14.Fcos 15.FX² 16.+ 17.P4
18.IP9 19.Fsin 20.IPA 21.Fsin 22.x 23.P1 24.Fsin^{-1} 25.P2 26.IP1
27.FX² 28.1 29.↔ 30.-- 31.F√ 32.IP7 33.x 34.F^{1}/X 35.P5 36.IP4
37.IP5 38.x 39.Fcos^{-1} 40.PB 41.IP8 42.IPA 43.+ 44.PA 45.IPB
46.C/P 47.BP 48.00

Instructions:

1. F PRG, input program, F ABT, B/O.

2. Input in registers: μ_i in PA, $\Delta\mu$ in P8, Ψ in P9. Registers P1, P4, P5, PB and P2 are on-line.

3. Input values n_y from graph of controlling function in reg. X, C/P; value of bank angle γ in reg. X, PB. Value of angle of trajectory incline θ in reg. P2.

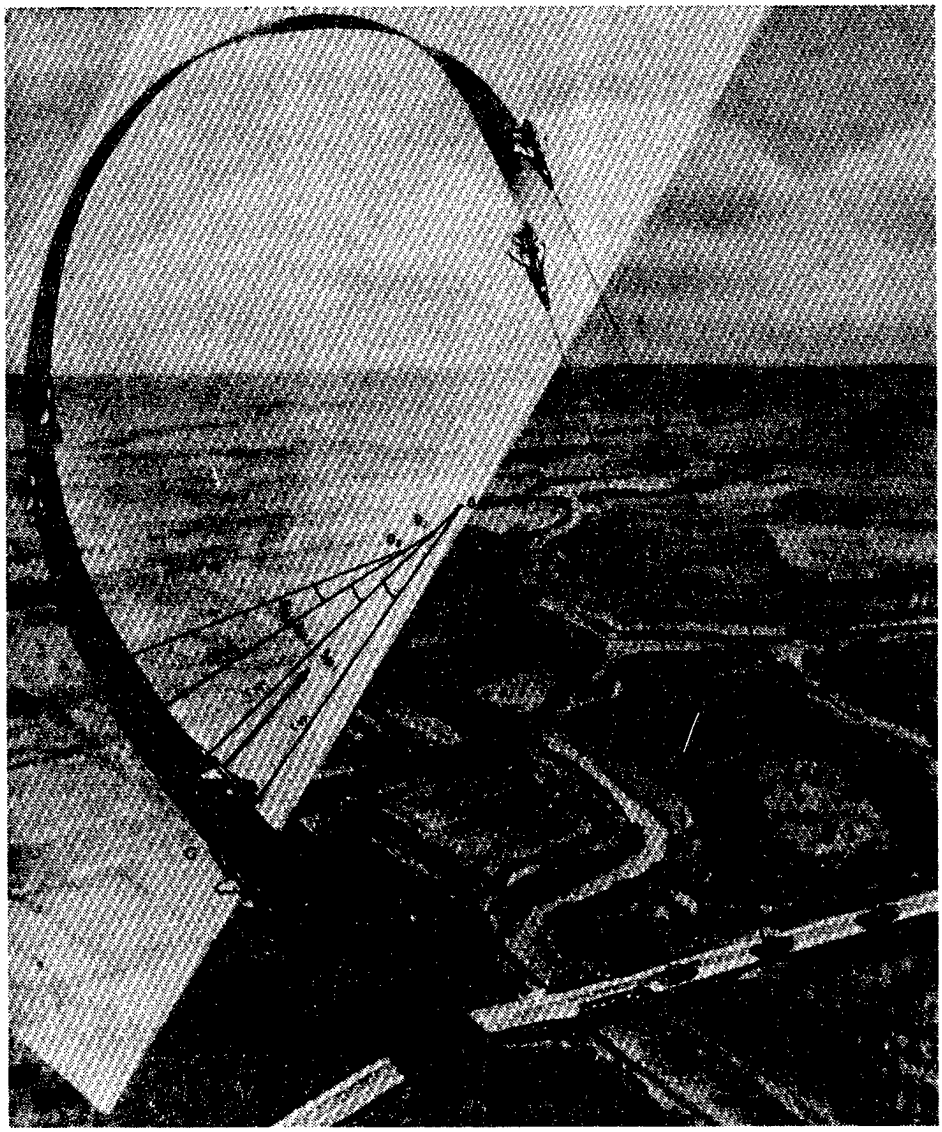
4. For calculating in the subsequent point, move to point 3.

Example. Initial data: $\Psi = 45°$, $\Delta\mu = 15°$.

1. $\mu_1 = 15°$, $n_v = 3.5$. Results: in reg. X -- 34.337253, $\gamma_1 = 34°$; in reg. P2 -- 10.54529, $\theta_1 = 10.5°$.

2. $\mu_2 = 30°$, $n_y = 5.0$. Results: in reg. X -- 40.976503, $\gamma_2 = 41°$; in reg. P2 — 20.704813, $\theta_2 = 21°$.

3. $\mu_3 = 45°$. Results: in reg. X -- 46.605504, $\gamma_3 = 47°$; in reg. P2 -- 30.000003, $\theta_3 = 30°$ and so forth. The calculating time of one step is ≈27 sec.



More Thorough Training, Follow-Up for Young Pilots Pressed

91440049f Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 21-22 Russian No 7, Jul 87 pp 21-22

[Article, published under the heading "Young Officers: Problems of Development," by Maj N. Tsvetov, military pilot 1st class: "I Request a Check-Out Flight"]

[Text] From the loudspeaker mounted in the room of the airfield command post came the report:

"515. Wheels, flaps down, ready for landing."

The flight controller, Lt Col A. Spiridonov, shifted his glance to where the missile-carrying aircraft piloted by Lt V. Karpov approaching the airfield should appear. There, in the area of the outer beacon, against the background of the sky, he quickly located a dark spot which, in drawing closer, assumed the outline of an aircraft. Having permitted the landing, he began to closely watch the flight. In smoothly bringing the fighter to the ground, the pilot skillfully landed the aircraft.

Vladimir Karpov successfully passed the difficult exam for receiving the qualification of military pilot 2d class, although this had been longer for him than for his associates.

...At one time scheduled flights were underway. Having requested permission to land, Karpov came out precisely on the landing course. Then the flight controller discovered that the pilot was maintaining above-established speed. The warning immediately came through the airwaves:

"515, speed!"

Vladimir attempted to correct his mistake. He reduced engine speed and the angle of descent, trying to more quickly lower his speed. Approaching the runway, the aircraft touched down and then took off again....

The flights were over. Lt Col Spiridonov took up the log and wrote: "Lt V. Karpov. Rough landing. Potential air accident. Cause..." and he wondered. What lay at the basis of the young pilot's mistakes? There was no uniform answer here. There had to be a profound and complete analysis employing the materials of the inflight monitoring equipment.

The officer summoned the flight commander, Capt S. Petrov, who had trained Karpov and prepared him for flying. He gave him the task of analyzing the error of his subordinate and examine the SARPP [aircraft automatic flight parameter recorder] film.

"An incorrect allocation of attention," was Petrov's reason for the mistake, without reflecting much. "The pilot is young and has little experience. That is the problem. In approaching the landing he overlooked the monitoring of speed and tried to keep on the approach course. Karpov is to blame. I will take measures...."

Such haste aroused doubt in the deputy regimental commander, Lt Col Spiridonov. The formula was very streamlined: "Incorrect allocation of attention." This could be applied to any occasion. But why did the pilot lack attention, what lay at the basis of his error? Was it excessive overconfidence or a lack of training?

The communist leader decided after the flights to have a talk with Karpov and the instructors and to examine the flight documents. All the more as at a recent session ofthe party committee where he was a member they had raised the question of the professional training of the young pilots.

"The lieutenants will be on afterburner conditions according to the introductory program," said the party committee secretary then. "Won't this reflect on quality? Some may not master one exercise as they should and he must be planned a new one. Some act unconfidently in landing and become muddled in a difficult situation."

Spiridonov could not help but agree with this. It was essential to seek out an optimum solution to the problem. And immediately. First of all, the officer determined to check the training methods for the young aviators in the flight of Capt Petrov. Having delved into things he was convinced that this question had not been fully worked out here.

Here, for example, is what was shown from an analysis of the flight training of Lt Karpov. The officer, having returned from leave, began to fly. In the very first check-out sortie he made an error in landing. This instance should have alerted the instructor. He should have revised the plan for the breaking in of the lieutenant, given more attention to trainer exercises, helped in thoroughly studying the requirements of the leading documents on flight preparation and checked his knowledge. Then he should have again flown with Karpov in a two-man trainer, demonstrated the correct landing approach and drawn attention to mistakes.

But Capt Petrov took another decision. On the following flight operations shift, he again planned a check-out flight with Karpov. Only now in landing he himself performed the main work in controlling the aircraft. After this, he decided to permit the lieutenant to solo in a combat aircraft. He endeavored to carry out the instructor's instructions, but again made a mistake.

More and more frequently Karpov's name figured in the log of the flight controller. A mistake and another mistake.... Each landing became an unique psychological barrier for him. And the moment came when Vladimir felt a lack of confidence in his own forces and capabilities. It seemed to him that he had lost those skills which

he had previously acquired. This alarmed him. "Must I give up flying?" wondered Karpov. The young officer conquered his weakness and decided not to give up.

"I would like a check-out flight," he said, turning to the commander.

He replied:

"You go to the hospital to the flight medical commission. Come back and then I will plan it."

When the lieutenant had returned to the unit, another figure, an experienced pilot, was busy with his flight preparation. However, in working with him on the landing, he not so much helped Vladimir correct mistakes as he demonstrated how he was able to execute this element himself.

Then Karpov in the landing committed a potential accident.

This occasion and an analysis of it became the subject of a major discussion both at an official meeting of the regiment's officers and at a party meeting. Lt Col A. Spiridonov clearly formulated the reason of the lieutenant's mistake: a lack of training. And he said outright that the guilty parties here were the flight commander and the squadron commander. Nor did he remove the blame from himself, because the work of breaking in the young pilots should have been under his supervision.

Then they decided to review the preparation and training procedures for the young officers. The aviators made many useful proposals.

...The voice of Lt V. Karpov distracted Lt Col Spiridonov from the memories of those times. The pilot was requesting permission to shut down the engine. Having given the "OK," the flight controller turned to his assistant:

"Well, an excellent grade for Karpov's landing. Let us enter that."

And he thought to himself: "Here another pilot has firmly claimed his wings."

10272

Maturing, Development of Helicopter Personnel in Afghanistan Viewed

91440049g Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 22-23

[Article, published under the heading "The Motherland Has Decorated Them," by Capt D. Lyamochkin: "Dependable in Deed"]

[Text] Aviators are usually not very willing to talk about their service and particularly about themselves. And our talk with Sr Lt Aleksandr Ishchenko, a student at the Air Force Engineer Academy imeni N.Ye. Zhukovskiy and who had received the Order for Service to the Motherland in the USSR Armed Forces 3d Degree and the Medal for Combat Services, initially flagged.

His path into aviation was simple and usual. School, the military aviation technical school which he had completed with honors. Service in one of the units of the Baltic Military District as a helicopter flight technician.

For the helicopter personnel it was the rule that they accepted the joy of success and the bitterness of defeat equally. Possibly this is why they look so carefully at the new men. But once they trusted the man and accepted him, nothing could shake these relations. This was a specific feature in their service both in the sky and on the ground: to always work together and be ready to help one another.

Aleksandr was immediately accepted in the crew. A man of few words, efficient, knowledgeable of his job and able to value friendship, he quickly won authority among his comrades. Sometime later, Ishchenko with a group of fellow servicemen was sent for further service in one of the subunits of the limited Soviet troop contingent in Afghanistan.

Intense days of combat training commenced. The arriving Soviet aviators became familiar with a new flight area for them and improved their skills in mountain flights.

Once a flight of helicopters flew into a gorge where, according to intelligence data, remnants of a dushman band were concealed. The helicopters swept the steep slopes of the range. Suddenly from a shelter they were hit by a large-caliber machine gun. The bandits had given themselves away. One of the helicopters went in against the target. Launch! The missiles flew to where the fiery sting of the dushman machine gun could scarcely be made out. The firing emplacement was neutralized.

After landing back at the airfield, Aleksandr discovered several holes on the blade of the main rotor and in the helicopter's skin. Only now did he feel acutely that these bandits were firing at him and his comrades who were carrying out their international duty, and became aware of all the seriousness and responsibility of the task entrusted to him.

Ishchenko was not alone in feeling such thoughts. Each aviator to himself vowed to spare no effort, and if need be, life itself, for the sake of the common undertaking. And they kept their word.

For example, the crew commander, Capt Vladimir Zhukov, in a difficult combat situation, under dushman fire, coolly shut down the failed engine and landed the helicopter on a level "nose" of rock. Landed is not the word. It was literally stuck to the rock on the very edge of a cliff. Later the aviators in several hours repaired the helicopter under dushman fire and the merciless rays of the Afghan sun.

Or can one forget the crew of Capt Ye. Satmanov. That sortie upon the alert became the last for the helicopter crew. The helicopter commander, Yevgeniy Satmanov, the navigator Vladimir Zyuzin and the flight technician Sergey Bakhtin over the mountains unexpectedly fell into an ambush and the engine was set afire by the dushman bullets. Satmanov directed the flaming helicopter directly into an accumulation of bandits and at the cost of his life and his comrades destroyed them....

All of this occurred before the very eyes of the squadron commander. His heart was filled with anger. He did not allow the surviving dushman to take cover. A hail of deadly machine gun bursts and missile launches descended on them.

As is known, a person shows himself in difficulties. This was the case also for Ishchenko. No matter how the situation developed, he did not lose his presence of mind and he carried out his duties unfailingly.

In the Afghan skies, the flight technician often has to fly as a "passenger." He must always be ready with a forced landing to perform the necessary repairs, to jump out of the helicopter literally in the air and indicate to the pilots a suitable place for landing. This is dangerous. But there is no other way in the mountains.

For Ishchenko, one of these instances almost ended badly. The helicopter was hovering over the ground. Aleksandr was preparing to jump out of it. At the moment of his jump, the helicopter unexpectedly rose sharply. He had to jump almost from a height of 5 m on sharp rocks. Another time the helicopter landed on an alpine plateau. The engines were working at full power. The dust raised by the rotor was so dense and hot that it seemed to Ishchenko that he was jumping into a hell: he could see nothing, sand grated on his teeth and his eyes stung....

But this is a trifle in comparison with an assault landing, when he must be the first to jump out and indicate the landing area. Only then from the cargo hatch do the assault troops appear, take up their firing positions and begin firing. Until then the flight technician is the "most visible" figure on the battlefield. The dushman fire at him first.

Ishchenko repeatedly heard the whistle of bullets, and saw how they crumbled stones and raised fountains of dust nearby. But danger never prevented him from carrying out his duties. And when necessary the flight technician also became the flight gunner.

...The attack by the helicopter troops was a surprise for the dushman. Ishchenko was firing a machine gun. The bandits caught by surprise fiercely fired back on the move, they hid in crevices and slid, like snakes, through shelters. However, the helicopter fire caught them.

Suddenly there was the smell of smoke in the compartment. The cover set afire by incendiary bullets burst into flame. The fire was crawling closer to the metal boxes with cartridges. A stream of fuel was pouring out of a pierced tank. Now it was spreading through the compartment and would then enter the pilot's cockpit and then.... There was not a second to spare. Having opened the armored door, Ishchenko shouted:

"Cover jettisoned!"

After returning to the base, the then squadron commander, Lt Col Ye. Zelnyakov, who subsequently was awarded the title of Hero of the Soviet Union, praised him: "Good fellow, you did not lose your head...."

In serving as part of the limited Soviet troop contingent in Afghanistan, I had a chance to reassess a great deal," said Ishchenko. "For example, I have recalled repeatedly my father's stories about the war and about military comradeship."

Genadiy Ivanovich Ishchenko was a veteran of the Great Patriotic War and a participant in the defense of the Caucasus. He often recalled the hard fighting of 1942. The young Red Armyman at that time did not know whether they could withstand the thrust of the units of the Edelweiss Division which had been specially trained for fighting in mountain areas. But they firmly remembered something else: the motherland's order to stand to the death! And they did stand....

Now the son has taken up the baton of courage. And he carries it with honor. "He is dependable in deed," was how his comrades referred to him. The high praise of fellow servicemen with whom he had frequently been in a tight situation bespeaks a great deal.

Time has passed. Now the airfield and the helicopter parking area have been replaced by the spacious auditoriums of the famous academy. Ishchenko himself has

changed. He has matured and grown stronger. The experience gained in Afghanistan has helped him in further service as an engineer and leader of the IAS [aviation engineer service]. He is studying diligently. The communists have elected him to the subunit party bureau. Aleksandr Ishchenko is a humble, dependable man who is loyal to his duty and his word.

10272

Pilot Self-Assessment Essential to Flight Safety

91440049h Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 26-27

[Article, published under the heading: "Flight Safety: Experience, Analysis, Problems," by Maj A. Bondarenko: "Do Not Forego Principledness"; ongoing discussion of the article "The Skies Do Not Forgive Mistakes"]

[Text] The article by Lt Col V. Antyufeyev has touched upon many questions influencing flight safety. At the same time, the author has overlooked the importance of the moral aspects in the training of air fighters. Just how important this is can be judged from the following example.

"I heard that you wanted to talk with me. I can guess what will be the topic," said Maj V. Li in introducing himself. "Well, I have more than enough free time. I will not have to prepare for flights anymore...."

I understood the state of Viktor Chansebovich [Li]. The officer still cannot agree with the categorical: "As of tomorrow you will fly no more!" He did not want to believe that from now on he would be grounded.

...On that day a strong sidewind was blowing. This circumstance—and particular attention was paid to it in setting the flight missions—had to be considered in carrying out the assignments.

The flights were going on in turn. The training bombers were taking off and landing. Then the aircraft piloted by Maj V. Li approached the airfield. Soon thereafter the aircraft touched down on the runway and reducing speed, taxied along the strip. But before the aircraft had put its nose wheel down to gain the necessary stability, the brake parachute opened behind it.

The crew commander had clearly been in a rush in taking such a decision. Who else but him should have known that with a two-wheel run with a released brake parachute and particularly with a strong "sidewind," the bomber could end up in the position of weathervane. And this is what happened. The aircraft turned into the wind.

Having realized his mistake, Maj Li was able to quickly assess the situation and ordered the parachute to be dropped. In order to rectify the situation and hold the aircraft on the runway, it was essential not only to completely deflect the rudder in the opposite direction of the turn, but also activate the left brake. The pilot was unable to do this in time. The bomber skidded off the concrete and only after several hundred meters of run came back on the runway. There was a potential flight accident.

"I was being overcautious," said Maj V. Li later. "An elementary error in piloting technique. It could happen to anyone...."

Yes, at that time the officer lacked tenacity and coolness. This, as they say, is a rectifiable thing. But in what had happened there was a much more important aspect, the moral one. And in order to understand this, let us turn back over 6 years.

...On one September day, Viktor Chansebovich was returning home from service. He was in a good mood. He was thinking about the forthcoming flights and not assuming that he would not be flying soon. A motorcycle appeared out of nowhere and knocked him down. The pilot was delivered to the hospital with a compound fracture of both bones of the left shin. There he underwent an operation. The process of recuperation was long. There were complications. Viktor Chansebovich complained of limited movement in the left ankle. The pilot was sent to the district military hospital.

But then the course of treatment was over. Maj Li returned to the aviation garrison. He was concerned about how they would receive him in the collective and what was coming for him? The flight commission felt it possible for him to continue flying. But the officer was concerned that it would be difficult to recover the lost skills. What would happen?

The fellow servicemen showed maximum attention to him and did not let him lose heart. In truth, initially Viktor Chansebovich was appointed to the position of the combat control officer. The commanders reasoned, let him get on his feet and grow stronger.

A year passed filled with concerns and intense work. Maj Li refreshed his memory of the requirements of the guiding documents and actually learned to fly anew. Comrades and commanders supported him in every possible way. However, it must be said that not everyone believed in the possibility of his returning to service. They said right to his face: Don't torture yourself, take a discharge while it is not too late. But this only caused stubbornness in the pilot's heart. At whatever the cost he wanted to show the falaciousness of such advice.

Tenacity and willpower brought results. Li was returned to flying. With the help of the experienced officers N. Melikhov and M. Gavv as well as others, he mastered a new position: aircraft commander and senior flight instructor.

Flights and then more flights.... Maj Li in rapture. In his words, he felt better in the skies than on the ground. Of course, mistakes also happen. Certainly Viktor Chansebovich, as they say, began from scratch and relearned how to maintain equilibrium in cloudy routes. No one guessed that each flight cost him so much effort. He was silent about this, although he was well aware that the motor function of his ankle had not been fully restored. The officer continued to take special therapeutic physical culture in developing his leg, but still feared that it would sometime fail him. An what Li feared happened.

"My foot dangled," said Viktor Chansebovich, disconcertedly. "I could not depress the pedal. The co-pilot was still young. I made a mistake. If there had been someone else with whom I had flown previously, I am confident that such a thing would not have happened."

Of course, it is possible to seek out justification and complain of a confluence of circumstances: the weather conditions were difficult and the co-pilot had little experience.... But we feel this is not worth doing. Li himself was to blame for what happened. On the one hand, one can be proud of him, and from his example teach others a love of one's profession and tenacity in achieving the set goal. But on the other.... His unreasonable stubbornness gained the upper hand over a sober assessment of his flying capabilities.

The problem was that even before Maj Li had been beset by doubts as to the safe conclusion of the flights. Particularly when the weather conditions grew difficult. He gradually lost his former self-confidence and without this it is difficult to hope for success in the air. The chief of the regiment's medical service repeatedly asked how the pilot felt and requested that in the event of a drop in the ankle's function to immediately inform him. But Viktor Chasebovich did not follow the advice. And the commander's words merely became a cold shower for him:

"Enough of tempting fate. The mere desire to fly is not enough...."

It is a pity that Maj Li did not himself reach this conclusion earlier. Of course, it is hard for a pilot at the peak of his forces to give up flying. But, as was rightly pointed out by one of his fellow servicemen, we not only choose the skies but they also choose us. And for this reason an air fighter should be healthy and always ready for major testing.

In any undertaking a principled approach to assessing one's capabilities is required of every man. This quality is particularly essential for those involved in flying. It helps assess one's forces to achieve a goal, to objectively weigh all the pluses and minuses and decide whether you are capable or cannot carry out the set task. And Viktor Chansebovich lacked precisely such principledness and self-criticalness. He did not want to admit to the fact that his physical capabilities and psychological potential were not the same as they were several years previously.

No, it was not the wind and not the inexperience of the co-pilot that had not been considered by the aircraft's commander at that moment. He did not consider that any attempt to deceive the skies sooner or later would lead to lamentable consequences.

10272

Consideration of Human Factors Recommended in Cockpit Design

91440049i Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 33-34

[Article, published under the heading "Human Factors in Aviation," by Yu. Yakimov, pilot engineer 1st class: "How to Eliminate the Contradiction?"]

[Text] Aviation construction, as is known, develops on the basis of a range of sciences each of which has made its own historically determined contribution. It happens that some areas of knowledge or directions of science outpace others and then the creators of an aircraft are confronted with the problem of how to consider in the aircraft the latest scientific achievements which advanced scientific thought possesses by the time of designing and what can realistically be incorporated in industrial production?

In the interaction of man with equipment, that is, in the "pilot—aircraft" system, until recently the technical sciences have dominated in all stages of developing aircraft. Specifically aviation equipment, as a part of the system, received greater attention from its developers and as a result of this there was a so-called machinocentric approach. At the same time, researchers on the human factor worked less intensely and fruitfully. They have major scientific practical achievements but, unfortunately, their recommendations were not always taken into account. Thus arose a discrepancy between the capabilities of the aircraft and the man who controlled it, and the "pilot—aircraft" system did not function fully. To put it another way, it was more difficult for the pilot to work while the aviation system was employed in a limited range of its technical and flight characteristics.

Let us endeavor to analyze just one element: the conformity of a modern aircraft cockpit to the pilot's capabilities of controlling it from the viewpoint of the organizing of the information field.

In the opinion of aviators operating different types of aircraft, the cockpits are often oversaturated with information sources. Because of this the contradiction is heightened between the constantly increasing amount of information required to control the aircraft and the pilot's abilities to quickly and accurately perceive and process this information. While the inexorable laws of aerodynamics have been "concerned" with the shape of the air frame and these have forced the elimination of everything superfluous, no one, in essence, has been properly concerned with the "informational redundancies" in the cockpit. And it is precisely here that the specialists in engineer psychology should have their say.

It is time, in my view, even in the stage of working out the cockpit to consider the psychological features of the pilot's activities during a flight and intelligently employ the laws of flight labor.

It is important to remember that the control of an aircraft is not merely the total of the responses to outside or instrument data. The readings of the dials, instruments, indices, figures and symbols for the man on the ground are a statistical description of the aircraft's position, while for the pilot executing the flight this is space, motion and time. In other words, the coded information units (instrument readings) are transformed by him into a picture of the characteristics of the aircraft's movement. On the basis of precisely these ideas and developed algorithms of actions, piloting is carried out. And the closer in form and sense the instrument data are to the "working" ideas of the pilot, the quicker and more easily they are written in piloting algorithms and the simpler and more accurate the control of the aircraft.

Experiments have shown the following pattern: the higher and closer the level of data generalization to the operational-logical scheme of control, the higher the speed and accuracy of perceiving the instrument readings (sometimes by double).

In controlling a combat aircraft, particularly under instrument flight conditions, the pilot works with the aircraft's information model which he mentally constructs lying on the instrument readings. All the personal potential of the pilot is involved in this process including knowledge, skills and experience gained over the entire period of flight work. As a result of the interaction of perception and memory, he develops an idea about the spatial position which is the base component for the flight's image. Due to thinking in images, the pilot picks up on a much larger number of relationships between the instrument readings and the immediate sense of the aircraft, between the previous and expected events in the sky. The image of the flight provides an opportunity to forecast situations and hence read the instrument readings not as completely new but rather to integrate two images: present and preceding.

Such an approach in forming the informational field of the cockpit makes it possible to more clearly coordinate technical innovations with the pilot's psychophysiological qualities. Let us trace this using the example of the indicator for the position of a transport aircraft's control surfaces.

Up to the present, the position of control surfaces has been depicted as is shown in Fig. 1. Here the shortcomings are obvious: uniform scales and indices carrying information about the control surfaces are located close together and this complicates the perception of a specifically necessary signal; the shape of the control surfaces is not shown and because of this the pilot is forced to process code information into a real picture; the specific value of the information relating to the longitudinal and transverse control channels is not considered; the inevitable duplicating of the synchronized elements of the elevator, stabilizer and rudder encumber the face with superfluous information sources.

Definite advantages are found displaying the position of control surfaces using an image of flight (Fig. 2). In the given instance the following principles have been employed: information has been combined in accord with the operational and logical scheme of control, the depiction is based on its material source and has clearly expressed visibility which creates the effect of presence.

The conducted expert evaluation of the indicator face has shown that the flight personnel quickly and easily "masters" the new instrument, its readings are perceived dependably and virtually instantaneously, in a single glance. Here the important thing is the generalizing of the information is provided for the position of the high-lift devices, the reciprocal positioning of the elements of the horizontal tail and the lengthwise passage as a whole. The picture image approximates the "logical factor" of a higher order. This excludes incorrect perception and, consequently, mistaken actions. Due to such a form of coding, the pilot's thoughts are directed not at deciphering the indices but rather solving more complicated tasks.

Thus, the use of the flight image in designing the devices for displaying flight information based upon the achievements of aviation human factors makes it possible to significantly increase the effectiveness of flight service. At the same time, while awaiting the introduction of scientific data into new aviation equipment, we must not fly the already mastered equipment in the old manner without reorganizing what could be improved, even now, with minimum outlays.

10272

Report on Activities of USSR Cosmonautics Federation

91440049j Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 39-40

[Article by B. Pokrovskiy, member of the Bureau of the Presidium of the USSR Cosmonautics Federation: "The USSR Cosmonautics Federation"]

[Text] The USSR Cosmonautics Federation commenced its activities as an independent public organization on 29 February 1980. Its first chairman was the twice Hero of the Soviet Union, USSR pilot-cosmonaut, Maj Gen Avn A. Filipchenko. Since 1982, the Federation has been headed by twice Hero of the Soviet Union, USSR pilot-cosmonaut, N. Rukavishnikov. Many veterans of space rocket technology participate in our organization's work including: the first leader of the Baykonur Space Center, A Nesterenko, the first chief of the Cosmonaut Training Center, Candidate of Medical Sciences Ye. Karpov, one of the founders of the command and monitoring facilities and the first group of the scientific research vessels of the "astral flotilla" of the USSR Academy of Sciences, Hero of Socialist Labor, winner of the Lenin Prize, RSFSR Honored Scientist and Technician, Doctor of Technical Sciences and Professor at MGU [Moscow State University], G. Tyulin, the former leader of the first group of scientific research vessels of the "astral flotilla," the Lenin Prize winner Yu. Maksyuta, the Deputy Director of the Space Research Institute, the winner of the USSR State Prize, Candidate of Technical Sciences G. Tamkovich, who for many years worked in the collective of the command-monitoring system. Since the first day of the founding of the Federation the sports commissar and judge of the international category for cosmonautics I. Borsenko has been a member.

Among the basic tasks confronting the USSR Cosmonautics Federation are: the ideological-patriotic indoctrination of youth, propagandizing the achievements of Soviet cosmonautics, developing scientific-technical creativity in its main areas, assisting in accelerating the pace of scientific and technical progress and creative collaboration among scientific and production workers. The Federation is also entrusted with participating in working out the conditions, rules, provisions and other documents involving the recording and drawing up of materials concerning record and pioneer scientific-technical achievements set by the USSR pilot-cosmonauts and domestic space equipment as well as submitting materials to the International Astronautics Commission of the FAI [International Aviation Federation] and other international organizations.

At present, the organizational structure of the USSR Cosmonautics Federation is undergoing the process of reorganization and clarification. It includes scientific-technical, artistic and veteran councils, sections on scientific and applied areas, over 100 collective members representing various organizations, the cosmonautics federations of Azerbaijan, Georgia, Kazakhstan, the Ukraine, as well as a number of the cosmonautics committees in the nation's oblasts and cities.

Azerbaijan has established good school cosmonautics museums. In Georgia, on the basis of the Polytechnical Institute, work is being carried out on space technology, while in Latvia, one of the best schools of young pilots and cosmonauts is in operation; in Uzbekistan they have developed space and rocket modeling. More than 1,000 meetings, talks and lectures were held at the People's University organized by the Leningrad Cosmonautics Committee.

Ye. Matysik has made a major contribution to establishing school cosmonautics museums. In 1933, he participated in the preparation and launch of the first Soviet liquid-fuel missile GIRD-09 designed by M. Tikhonravov. A certificate was drawn up on this historical event and this is now kept in the archives of the USSR Academy of Sciences. Next to the signature of the senior engineer S. Korolev, on this certificate is the signature of the leader of the mechanics brigade, Ye. Matysik.

We should also mention the work of our colleague who is the head of the chair of one of the Tibilisi VUZes, Doctor of Technical Sciences A. Bentaneli, who ably combines his basic job with social activities.

But still involuntarily we must reflect that not everything has as yet been done and that much is expected from our volunteer organization by millions of amateurs and admirers of cosmonautics. The members of the Bureau are still rare visitors to the federation's primary organizations and many of these lack activity and purposefulness in their work, particularly with the youth. And how many people we have who are ready to work without compensation for the sake of carrying out their ideas! It is our immediate task to help them.

How to overcome these and other shortcomings, to reorganize the Federation's work and raise it to a level of today's requirements was the subject of a professional, frank and principled conversation at the first congress of the USSR Cosmonautics Federation held in Moscow on 17 January of the current year. In the accountability report by the Federation's chairman and numerous speeches by delegates, chief attention was given not so much to the positive work results as to criticizing the shortcomings and the ways for eliminating these in the shortest period of time.

The congress adopted the By-Laws of the USSR Cosmonautics Federation and elected its leading bodies. N. Rukavishnikov again became chairman. The delegates greeted with satisfaction his statement that upon a decision of the directive bodies, the Federation from now on would be under the authority of USSR Glavkosmos [USSR State Committee for Space]. Elected to the Federation's leading bodies were the congress delegates,

USSR pilot-cosmonauts A. Aleksandrov, A. Berezovoy, I. Volk, L. Kizim, Yu. Romanenko and V. Savinykh, scientists, members of creative unions and other fans of cosmonautics.

At the Bureau session held after the congress, a plan of specific measures was worked out and adopted to carry out the critical comments and proposals voiced by the delegates; the leaders of the structural subunits were confirmed. In a word, a start was made to a restructuring. However, if one speaks frankly, and this is precisely what must be done now, the results still leave much to be desired. For this reason the central and local leading bodies of the Federation and their activists should more energetically carry out the decisions adopted by them in order to properly greet the 70th anniversary of Great October and its significant space date celebrated on the eve, the 30th anniversary of the launching of the world's first artificial satellite.

10272

Development of Satellite Communications Systems Described

91440049k Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 pp 40-41

[Article, published under the heading "Cosmonautics for Science and the National Economy," by N. Bondarev: "Satellite Communications"]

[Text] The intensely developing integration, the rapid growth of international ties in production and trade and in the area of culture and scientific research activities have brought about an annual increase in the flow of information circulating over the domestic, international and intercontinental communications lines. Each year the world handles around 1 billion telephone calls, including over 10 million long distance, at least 150,000 international, including around 100,000 intercontinental. This would be impossible without employing earth satellites.

On 23 April 1965, with the launch of the satellite Molniya-1 a start was made to establishing the communications satellite system (SSS). At present, in the interests of the national economy and in the aims of developing international collaboration, the Orbita, Ekran and Moskva systems are operated employing communications satellites of the Molniya series in high-elliptical orbits and Raduga, Ekran and Gorizont in geostationary orbits. Such a combination of satellites positioned in different orbits creates the best conditions for organizing communications over the entire territory of the nation. Telephone, telegraph, phototelegraphy, radio broadcasting, television, the transmitting of various reference and other materials, the exchange of information in large automated control systems and computer networks, and the transmitting of mats for printing newspapers—this is a far from complete list of the tasks carried out by communications satellite equipment in our days.

The merit of satellite systems is in the global reach of the earth surface (independently of the place of human residence and activity), the high quality and reliability of the communications channel and economy. However, it must be pointed out that satellite communications does not replace or drive out the ground types of communications but merely compliments them, adding a new content.

The Orbita satellite communications system was developed 20 years ago, soon after the launching of the first Molniya-1 communications satellites. This equipment its then-unique 40-watt relay made it possible to provide in the decimeter wave band a direct telephone communications channel between Moscow and Vladivostok and transmit television images. At present, these satellites have been modernized. The parameters of the high elliptical orbit have also been changed somewhat (an apogee of around 40,000 km over the Northern Hemisphere, a perigee of around 500 km, an orbital period of 12 hours and an inclination of 63 degrees) and which is very convenient for servicing the northern part of our nation's territory with their aid. Four satellites, in appearing in sequence at the apogee for 6 hours provide continuous servicing of the entire zone of radio coverage.

The signals from the satellite are picked up by ground stations of the Orbita satellite communications system and these are a circular concrete building on the roof of which is a parabolic antenna with a 12-m diameter, with the equipment located inside. The comparatively small dimensions of the antenna and the simplicity of its design have been caused by the high power of the satellite transmitter and by the fixed orientation of its transceiving antennas to the earth. The satellite communications network, in encompassing constantly new cities and areas of our country, at present includes over 100 stations of which over 10 are transceiving.

In addition to receiving and transmitting programs of Central Television, the Orbita stations are used in the interests of radio broadcasting, phototelegraphic traffic, telephone and telegraph communications as well as for transmitting mats of the central newspapers. The capacity of the telephone network in the Orbita system, for example, is 480 duplex telephone channels and this corresponds to 2.5 million channel-km of equivalent ground network.

The subsequent modernization and development of the Molniya-type satellites have led to the creation of more advanced equipment, first the Molniya-2 and then the Molniya-3. They, in particular, have a more powerful relay (up to 80 watts). All of this has made it possible to increase by several-fold the number of satellite communications channels and provide the transmitting of color television images with higher quality. Correspondingly

the ground stations were modernized and these were named Orbita-2. Since 1980, for serving the Orbita system in the northeast of the nation, Raduga and Gorizont satellites have been employed positioned in a geostationary orbit.

In the mid-1970s, it became clear that it was essential to find a new technical device which would make it possible to increase the economicness of the system, as the construction of ground permanent stations of this type in small population points and towns of Siberia and the Far North, where the network of cable and radio relay communications lines was not sufficiently developed, let to high expenditures for each television receiver. The Ekran television broadcasting system became such a device. Since 1976, it has transmitted the Central Television and Radio programs to inaccessible and low-populated areas of the nation. Transmissions from the Ekran satellite can also be received by seagoing vessels in the Arctic waters within the zone of the satellite's radio coverage and when equipped with receivers.

The reception of the television programs is carried out by using simplified receivers (costing almost 100 times less than the cost of the Orbita stations). This has become possible due to the increase in power (up to 200 watts) of the relay on the Ekran satellite, the signals of which through joint-use or individual receiving antennas go directly to the household TV receivers and in each 24 hours for 18-20 hours provide the transmission of three programs: one colored television and two radio.

A further widening of the zone covered by color television and radio broadcasting became possible at the end of the 1970s after developing the Moskva television broadcasting system employing Gorizont satellites. In this the principle of organizing communications has been so chosen that the zone served by one satellite includes two or three time zones. This makes it possible to show the viewers the most important and interesting broadcasts at a convenient time for them.

The system consists of a transmitting ground station, the satellite relay on board the Gorizont and a network of ground receiving stations equipped with low-power transmitters.

The Moskva station is rather simple. The amount of equipment for it is so small that this can be located, for example, in a room of a rural club. The receiving antenna of the station with a diameter of just 2.5 m can be placed on the roof of a building or on the ground on a concrete or stone slab. The time for installing, assembling and putting the station into operation is several days.

For effective reception of the Central Television programs in areas where the construction of permanent stations is inadvisable or difficult, a transportable version of the Moskva receiving station has been developed. All the equipment for it is located in the body of an ordinary truck which together with the antenna is mounted on a standard low-built trailer chassis.[sic]

With the aid of the Ekran and Moskva receivers, many embassies in different nations regularly receive the first national program of Central Television.

Due to the high technical level of the Gorizont satellite, to the simplicity and compactness of the receivers, and to the possibility of locating them directly at the printing plant, a most important task was carried out: the simultaneous publishing of the central newspapers throughout the nation.

The USSR is an active participant in creating international satellite communications systems for different purposes employing Soviet-built equipment. The first steps in the area of international cooperation were taken in the 1960s, when the Soviet Union together with France began to develop color television broadcasts with the aid of the Molniya-1 satellite, and in particular using the Secam method.

At the beginning of the 1970s, after launching the Molniya-2 satellites, a direct communications channel was organized between the USSR and the United States. In 1971, an agreement was signed for establishing the international Intersputnik SSS. At present, the system leases channels on the Gorizont satellite and provides 60 percent of all the television traffic between the participating nations. The television and telephone channels of the Intersputnik SSS are widely used for serving international political, cultural and sports measures. This was the case, for example, in the 22d Olympic Games. The "space telebridges" between Moscow and the capitals of other countries have had a great political response.

The USSR is one of the initiators of founding the Inmarsat international maritime satellite communications system. This system employs geostationary satellites and provides telephone and telegraph communications for ships both with national centers as well as ports around the world. The Soviet Volna combined maritime communications satellite system can be operated both with the Gorizont satellite for national communications and with Inmarsat for international.

The achievements of scientific and technical progress open up new horizons for employing the satellite communications systems. For example, for a broader coverage of the nation's population with television, a broad range of measures has been planned to develop and establish in the 12th Five-Year Plan promising television broadcasting systems such as Moscow—Global. With their aid we plan to broadcast several national television programs to the entire territory of the USSR and republic programs to the territories of the corresponding Union republics, krays and oblasts. One of the new areas in television equipment will be a stereo sound accompaniment.

If we look to the future, what can we say for 10-15 years ahead? With the aid of low-power and small-sized transceivers (of the transistor type and possibly even watches), millions of people will employ the SSS for individual communications. It will be feasible to employ satellites for "electronic mail" with the recipient receiving an image of the letter.

10272

Manual on Space Medicine Reviewed

91440049l Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 87 p 44

[Review, published under the heading "Criticism and Bibliography," by N. Gurovskiy, doctor of medical sciences and winner of the USSR State Prize of the book "Aviatsionnaya meditsina: (Rukovodstvo)" (Aviation Medicine: (A Manual)), edited by N.M. Rudnyy, P.V. Vasilyev and S.A. Gozulov, Moscow, Meditsina, 1986, 580 pages with illustrations, price 2 rubles, 70 kopecks]

[Text] The development of aviation equipment equipped with complex computers, the greater intensity of air traffic, and the constant rise in the national economic and defense importance of aviation have brought about a number of professional, psychological and health problems. For these medicine should promptly provide qualified answers and scientific and practical recommendations to aid aviation positions in carrying out a range of preventive measures with the flight, engineer and technical personnel.

In carrying out a flight mission on modern aircraft, there is a noticeable increase in both the amount and duration of acceleration effecting the flight crew and on helicopters there is greater vibration, and on long-range liners, monotony, the disrupting of diurnal rhythms and so forth. For this reason the work of a pilot, particularly in mastering new aviation systems and the methods of employing them, has become more intense, complex and responsible. Serious problems caused by the medical examination of crews confront, in particular, the medics. Where can they find the answers to the questions presently of interest to aviation physicians? Here they can be given inestimable aid by the fundamental work which has been published for the first time in our nation [the manual under review]. The high theoretical level of the publication and the rich factual material will aid the aviation medics in improving their skills. The book will evoke undoubted interest among aircraft designers, commanders, political workers and specialists in the aviation engineer service and flight support.

It examines psychophysiological and engineer-psychological (ergonomic) means for supporting and optimizing the flight activities during flights on various types of aircraft, the organizing of labor, recreation and maintaining the health of aviators, methods and means for combating fatigue and rehabilitation after extended flight work. Many of its pages are devoted to the results of clinical physiological research and to the particular features of the course of illnesses among flight and engineer-technical personnel. The book in a skilled manner sets out the procedural approaches to modeling the conditions of operator activities, to analyzing psychophysiological reactions and to determining the patterns underlying the labor of pilots, navigators, flight controllers as well as engineer and technical personnel.

The book consists of two parts.

The first is a brief essay on the development of Soviet aviation medicine and its current state. The authors of the publication examine the particular features of today's medicine in a profound relationship to the development of aircraft and helicopters of new types, and they extensively show the role of Soviet scientists in working out the theoretical bases of domestic medicine and in particular physiology and aviation hygiene. Many pages of the manual are devoted to toxicology and to ionizing and electromagnetic radiation. Also thoroughly examined is the effect on the human organism during a flight of such factors as barometric pressure, a shortage of oxygen, the enormous stresses in executing aerobatics, noise and vibration, angular acceleration and so forth.

The second part of the book is devoted to the questions of the psychophysiology of the labor of aviation specialists and to a thorough analysis of crew activities during a flight. It gives data on the particular features of spatial orientation during a flight, it examines the reasons for the development of illusions and deals with professional recruitment, training and instruction of flight personnel.

One of the chapters informs the reader about flight surgeon evaluations, the reasons for illness and the grounding of flight personnel due to the state of health, the prevention of this, and in particular to the rational employment of pharmochemical agents.

Here also are set out the problems of engineer psychology and human factors and the relationship of physiology and hygiene is shown. Information is rather widely and soundly given on the psychophysiology of flight labor as well as on the conditions increasing the effectiveness of professional activities of aviation specialists and flight safety.

The authors analyze the principles for the interaction of the pilot and the aircraft control systems. The psychophysiological components of these activities are examined in detail and in particular the flight image, the role of instrument information and noninstrument signals perceived by the pilot.

In this context one cannot help but point out the chapter "Pilot Spatial Orientation" which provides a notion of the complex reordering of physiological reactions which provide orientation of the crew during a flight.

The publication deals well with the altitude and dynamic factors of flight, the medical support for flight safety and the procedures for investigating flight accidents. The book ends with materials on the survival of the flight crew in the event of a forced landing or water landing in various climatic and geographic zones. This very important section contains not only the theoretical aspects of the important problem but also valuable practical recommendations.

In a review it is difficult to thoroughly examine the content of all 37 chapters of the book but a guarantee of its scientific value is the involvement of highly skilled specialists in work on it.

In positively assessing the content aspect of the publication, it must be pointed out that, regardless of the solid coverage of the book, not all areas of aviation medicine have been sufficiently treated. Thus, in our view, the problems of the morbidity rate of flight and engineer-technical personnel, the possibilities of the professional rehabilitation of a pilot, outpatient and ambulatory treatment of specific illnesses of aviators as well as the diagnosis of their pre-ailment forms have not been completely examined.

Obviously, they should bring together the questions of the practical activities of an aviation physician and the methods of his daily work. They have been touched uponin a number of sections and chapters of the book but have not been systematized.

As a whole, the book "Aviatsionnaya meditsina" has been written in good language, it contains many new precise medical definitions and terms, it has a large list of literature, a subject index, drawings and graphs and is very interesting to read.

The publishing of such a work is an indisputable success for the author collective and Izdatelstvo Meditsina. We believe that it will be highly regarded by specialists and by the broad scientific community and will become a desk-top book for every aviation physician.

10272

END